Anthropometry, Anaemia and HIV Testing Field Manual

2005-2006 National Family Health Survey (NFHS-3) India

International Institute for Population Sciences
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1 INTRODUCTION

1.1 GENERAL BACKGROUND

In 2005-2006, India will implement the third National Family Health Survey (NFHS-3). Like its predecessors, NFHS-1 (conducted in 1992-93) and NFHS-2 (conducted in 1998-99), NFHS-3 will be conducted under the stewardship of the Ministry of Health and Family Welfare (MoHFW), Government of India, coordinated by the International Institute for Population Sciences (IIPS), Mumbai, and implemented by renowned survey organizations and Population Research Centres. The technical assistance for NFHS-3 will again be provided by Macro International, USA.

The fieldwork in each state will be carried out by a number of interviewing teams. Field teams will generally consist of one field supervisor, one field editor, three female interviewers, one male interviewer, and one or two health investigators. Female interviewers will interview women only and male interviewers will interview men only. Height and weight measurements of male and female respondents and children under the age of six years will be done by the health investigator(s) of each team with assistance from interviewers, as needed. In the six high HIV prevalence states, women age 15-49 and men age 15-54 will be eligible for interview and HIV testing will be conducted in all sample households. In the remaining states, men will be interviewed in only half of the sample households. Interviewers will be required to make three callbacks if the eligible respondent is not present in the household.

1.1.1 Anaemia Testing

Anaemia is a condition characterized by reduction in the volume of red blood cells and a decrease in the blood concentration of haemoglobin in the blood. Red cells in the blood contain haemoglobin, which binds oxygen. As blood circulates, oxygen is transported from the lungs to the tissues by the haemoglobin in the red blood cells. A reduction in the volume of red blood cells in the blood decreases the amount of oxygen reaching the tissues and organs of the body, causing a range of adverse symptoms.

The HemoCue system (Hb 201+) will be used for Anaemia testing in the NFHS-3. This system consists of a battery-operated photometer and a disposable microcuvette, coated with a dried reagent that serves as the blood-collection device. The test is performed using a drop of blood taken from a person's fingertip. The results of the Anaemia test will be reported to the respondent (or to the parent or other responsible adult in the case of a child) at the time of the testing, and respondents with low levels of haemoglobin will be informed and advised to seek treatment.

1.1.2 HIV Testing

Acquired immunodeficiency syndrome (AIDS) is a condition caused by human immunodeficiency virus (HIV). It is a disorder of the immune system in which the body's normal defenses against infection break down, leaving it vulnerable to a host of life threatening infections, including unusual malignancies.

Most of the current information on HIV levels in India comes from surveillance of special populations such as women attending antenatal clinics, sex workers, or individuals treated at health facilities for sexually transmitted infections. However, these surveillance results do not yield an estimate of the prevalence of HIV among the general population. For example, the antenatal surveillance system excludes men and non-pregnant women. Therefore, the Ministry of Health has decided to test a representative sub-sample of women 15-49 and men 15-54 through the NFHS-3. Since HIV is transmitted principally through sexual contact, obtaining an estimate of the prevalence of HIV for these groups will provide a better estimate of the current level of HIV in India than is available from other sources.

HIV testing in the NFHS-3 will involve the collection of dried blood spots (DBS) samples on a filter paper card. This will usually be from the same finger prick used to obtain the sample for Anaemia testing. After the DBS samples have been collected the questionnaires will be transported to the field organizations for logging and checking, the DBS samples will be transported to the Ranbaxy blood collection centres, and from there these will be sent to the Ranbaxy laboratory in Mumbai, where the testing will be conducted. The testing will be anonymous, i.e., personal identifiers of individual respondents will not be retained with the DBS samples. Because the testing is anonymous, respondents will not receive the results of the testing. However, they will be offered a voucher to obtain free HIV counseling and testing at a collaborating VCT centre(s) near their community.

1.2 STEPS FOR CONDUCTING ANTHROPOMETRY AND ANAEMIA AND HIV TESTING

Measurement and Testing of Children

Follow these steps for measurement:

1. Identify all children in the household who are eligible for weighing, measuring, and testing. Children born in 2001 or later will be eligible for weighing and measuring. Children born in 2001 or later will be eligible for Anaemia testing;

2. The interviewer will record the **Line Number, Name** and **Age** of all eligible children in the household schedule in **Columns (69)** to **(71)** of the **Height and Weight** page. In **Column (72C)** the interviewer will record the month and year of birth of the child from the mother's birth history (Women's Questionnaire Section 2), and ask for the day of birth. For children not included in a birth history, the interviewer will determine the exact date of birth from the parent/responsible adult and record in **Column (72C);**

3. Perform weight and height measurement of all children born in 2001 or later according to instructions in Appendix A;

4. Record **child's weight** and **height** measurements in **Columns (73) to (74)** whether the child has been measured lying down or standing up in column **(75)**, and the **final result** in **Column (76);**

5. Record the child's height and weight measurements in the Anaemia brochure.

Follow these steps for testing:

6. For **Column (77)** on the Anaemia section, look back to Column (**72C**) to see if the child is less than 6 months, i.e., the child was born in the month of interview or within the 5 months prior to the interview. If the child has been born in the month of interview or within the five months just prior to the interview, this child will not be tested for Anaemia. Record '1' for this child and continue to the next child.

7. Record the **Line Number of the parent/responsible adult** of the child in **Column (78)**;

8. Obtain consent from the parent/responsible adult for the Anaemia testing and record the outcome of the consent process for each child in **Column (79)**. Obtain consent by reading to the responsible adult the voluntary consent statement provided in the questionnaire. The signature in **Column (79)** will be your signature, confirming that you read the statement to the responsible adult;

9. Collect a capillary blood sample from each child for whom consent has been granted and conduct the Anaemia test using the HemoCue device;

10. Record the **haemoglobin level** in **Column (81)** and the **final result** in **Column (82)**;

11. Inform the parent/responsible adult of the results and provide an informational brochure on Anaemia;

12. Provide a written referral to a health facility for medical treatment for any child with severe Anaemia (haemoglobin under 7g/dl).

Measurement and Testing of Women and Men

Follow these steps for measurement:

1. Identify all women and men from the household schedule who are eligible for weighing, measuring, and testing. Women age 15-49 years and men 15-54 years who have been interviewed will be eligible for weighing, measuring, and Anaemia and HIV testing;

2. The interviewer will record the Line Number, Name, and Age for each women/men in, **Columns (69)** to **(71)** of the **Height and Weight** page, the woman's/man's marital status, in column **(72A)**, and the woman's current pregnancy status in column **(72B);**

3. Perform weight and height measurement of the women/men according to instructions in Appendix A;

4. Record women's and men's weight and height measurements in **Columns (73)** and **(74)** and the final result in **Column (76)**;

5. Check the age of the respondent recorded in **Column (71)**. Then in **Column (77)** of the **Anaemia** and the **HIV Testing** section you will record whether the respondent is age 15-17 or age 18 or older. You will do this because if the respondent is age 15-17, consent for testing will have to be obtained from the respondent's parent or responsible adult as well as the respondent;

6. If the respondent is age 15-17, record the line number of parent/responsible adult of the respondent in **Column (78)**;

Follow these steps for testing:

7. If the respondent is age 15-17, seek consent for **Anaemia** testing from the parent/responsible adult. If the parent or responsible adult does not consent to the youth's anaemia test, circle codes '2' for REFUSED, sign your name on the blank line, and continue with Instruction (8). If the parent /responsible adult agree to the youth's anaemia test read the informed consent statement to the minor and record the outcome of the consent request in **Column (79)**. <u>The signature in **Column (79)** will be your signature, confirming that you read the statements requesting consent.</u>

8. If the respondent is age 15-17, seek consent for **HIV** testing from the parent/responsible adult. If the parent or responsible adult does not consent to the HIV test, circle code '2' for REFUSED in column **(80)**, sign your name on the blank line, and go to the next eligible respondent. If the parent/responsible adult agree to the youth's HIV test, read the informed consent statement for HIV testing to the youth. <u>The signatures in **Columns (79)** and **(80)** will be your signature, confirming that you read the statements requesting consent;</u>

9. If the eligible respondent is age 18 or over, seek direct consent of the respondent separately for Anaemia and HIV testing. Record the outcome of the Anaemia consent request in **Column (79)** with your signatures, and the outcome of the HIV consent request in **Column (80)**;

10. If consent for HIV testing is obtained, identify the next available complete set (row) of bar code labels. Paste the first bar code label in **Column (84)**, the second bar code label on a new filter paper card, and the third bar code label on the Blood Sample Transmittal Form;

11. Obtain a capillary blood sample from the finger prick. Use enough blood drops to fill at least **four** and a maximum of five preprinted circles on the filter paper card for HIV antibody testing in the laboratory;

12. Place the filter paper card with the blood spots in the drying rack;

13. If consent for Anaemia testing has been obtained, fill a new microcuvette with a drop of blood and conduct the Anaemia test using the HemoCue device;

14. Record the haemoglobin level in **Column (81)**; record the haemoglobin result in **Column (82)**, and the result for HIV blood sample collection in **Column (83)**;

15. Record the respondent's haemoglobin level in the Anaemia brochure for men, pregnant women, or other women, as appropriate;

16. Inform the respondent of her/his haemoglobin level and provide the Anaemia brochure;

17. Provide a written referral to a health facility for treatment for any respondent with a haemoglobin level of less than 7 g/dl;

18. Complete Questions **(85)** and **(86);**

19. Provide an informational brochure on HIV/AIDS, a voucher for free HIV VCT services, and a list of the nearest participating VCT centres.

20. When you meet the team supervisor, provide him/her with the names of the respondents with haemoglobin levels less than 7 g/dl who agree to referral, so that their names can be added to the Anaemia referral letter for that PSU (Primary Sampling Unit).

1.3 TRAINING OF INTERVIEWERS ON ANAEMIA AND HIV TESTING

Your training to conduct the Anaemia and HIV testing will consist of a combination of classroom training and practical experience that will provide you with the background necessary to perform these tasks during a field survey.

During the first phase of training, we will review with you various chapters of this manual. You will learn how to identify eligible respondents, record information relating to the testing in the household questionnaire or on special field forms, handle the technical procedures involved in specimen collection, testing and transporting, and other related instructions.

During the second phase of the training, there will be role-playing for the Anaemia and HIV testing in which you will practice by collecting blood samples from other trainees. During the third phase of the training, we will visit a nursery or a health centre and practice testing on consenting clients, including infants and young children.

During the final part of the training, you will be assigned to a NFHS-3 trainee team and will practice collecting blood samples from eligible children and adults in some pretest areas outside of those chosen for the NFHS-3 sample.

Before each training session, you should study this manual carefully along with the household questionnaire, writing down any questions you may have. You are encouraged to ask questions at any time in order to avoid mistakes during actual fieldwork. You can learn a lot from each other by asking questions and talking about problems encountered in practice and actual situations.

Like the rest of the NFHS-3 training, throughout the blood collection training, you will be given homework assignments for the evenings. You may be given tests to see how well you are progressing during your formal training period. At the end of the training course, your overall performance during the training will be assessed and we will select those of you who have performed the best to work in the main survey.

1.4 SUPERVISION OF INTERVIEWERS DURING BLOOD COLLECTION

Training is a continuous process. Observation and supervision throughout the fieldwork are a part of the training and data collection process. Your team supervisor and the NFHS-3 health and survey coordinators will play very important roles in continuing your training and in ensuring the quality of data. They will:

- observe some of your fieldwork activities to ensure that you are conducting yourself professionally, asking the questions in the right manner, and following the survey protocol correctly;

- spot check some of the eligible respondents selected for testing to be sure that you collected the blood specimen from the correct households and respondents;

- consolidate the field record forms, samples and the household questionnaire;

- meet with each member of the team on a regular basis to discuss performance and give out future work assignments;

- help to solve any problems that you might have with finding the assigned households, understanding the concepts in the questionnaire or dealing with difficult respondents.

The survey director may release from service any field staff member who is not performing at the level necessary to produce the high quality data required to make the NFHS-3 a success.

1.5 Organization of the Training Manual

The remaining chapters of this manual are organized to assist you in learning how to conduct these tasks. They include:

Chapter 2: Introduction to the equipment and supplies for the testing

Chapter 3: Recording information on the testing

Chapter 4: General procedures to follow in obtaining a capillary blood sample

Chapter 5: Specific procedures to follow in collecting blood samples for Anaemia testing from eligible children

Chapter 6: Specific procedures to follow in collecting blood samples from adults for HIV and Anaemia testing

Chapter 7: Precautions to follow in collecting samples

Chapter 8: Disposing of biohazardous waste

These chapters should be studied carefully during the training and used as a reference in the field when you have questions about how you should proceed in conducting the various tasks involved in testing.

2 MATERIALS AND EQUIPMENT FOR TESTING

This chapter introduces the various materials and supplies you will use for Anaemia and HIV testing. More detail on the use of these items is presented in Chapters 4-6, which describe how the testing will be performed.

2.1 MATERIALS AND SUPPLIES FOR PERFORMING FINGER (HEEL) PRICK

The capillary blood drop(s) used for Anaemia and HIV testing will be drawn from a finger. For children age 6 months to 12 months who are very thin, the drop for Anaemia testing may be drawn from a heel. The following supplies and materials (Figure 2.1) will be used in performing the finger (or heel) prick:

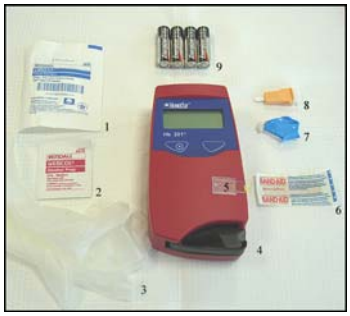


Figure 2.1 Supplies for performing finger (heel) prick

- **Non-powdered disposable Latex gloves:** are used to reduce the risk of blood borne diseases. Gloves must be worn by the interviewer and by anyone else who may assist with the blood collection.

- **Alcohol preps:** are used for cleaning the skin prior to puncturing the finger or heel.

- **Sterile gauze pads:** are used to wipe away the first drops of blood to stimulate a spontaneous capillary blood flow.

- **Adhesive bandages (Band-aids):** After the blood collection, an adhesive bandage has to be applied on the puncture site to avoid infection.

- **Retractable lancets:** The lancet is an automated, disposable incision device used to puncture the fingertip or heel. The device is specially shaped to fit easily on the skin surface, thus minimizing skin indentation. When the trigger is pressed, a surgical blade quickly protrudes from the device and then automatically retracts. The angle of the blade is set for maximum blood flow and the action of the blade is so fast it cannot be seen.

2.2 HEMOCUE PHOTOMETER SYSTEM

The HemoCue photometer system will be used for haemoglobin testing. It consists of the following items:

Figure 2.2 HemoCue microcuvette

- **HemoCue microcuvette** (Figure 2.2). The microcuvette is a plastic disposable unit that serves as both a reagent vessel and a measuring device. It contains a reagent (sodium azide) in dry form. The reagent is yellow and covers the tip portion of the microcuvette. The microcuvette is designed to draw up the exact amount of blood needed for the test. It is important to ensure that the entire portion of the microcuvette covered by the reagent (including both circle and the tip), is filled with capillary blood.

Although the HemoCue Hb 201+ system (photometer and microcuvettes) has proven to be durable and reliable under field conditions, there are some technical limitations. Microcuvettes are sensitive to humidity. Immediately after taking out a microcuvette, reseal and close the container. Follow theses requirements for the proper handling and storage of haemoglobin microcuvettes:

a) Record on the container the date on which it is first opened;
b) Remove from the container only those microcuvettes required for immediate testing;
c) Always keep the microcuvette container lid snapped on;
d) Keep the microcuvette container at room temperature and avoid exposing it to heat or strong sunlight.

Under these conditions, a microcuvette container can be stored for up to 3 months (90 days) after opening. Under field conditions, it is advisable to store the microcuvettes in the container for not more than a month. Sealed and unopened containers can be stored up to the expiration date on the container. The microcuvettes are stable for two years from the date of manufacture.

- **Disposable lancet** (Figure 2.3). The lancet **(Unistik3)** is automated, disposable incision device used to obtain blood samples from the fingertip or heel. The device specially shaped to fit easily on the skin surface, thus minimizing skin indentation. When the trigger is pressed, a surgical blade quickly protrudes from the action of the blade is so fast it cannot be seen.

Figure 2.3 Disposable lancet

- **HemoCue Hb 201 + photometer** (Figure 2.4). In addition to a thorough understanding of correct blood-sampling techniques, it is important to know the requirements for handling the HemoCue Hb 201+ photometer and storing the microcuvettes. Below are the technical requirements for appropriate use of the HemoCue Hb 201+ system.

The HemoCue Hb 201+ *photometer* measures light absorption and presents the results on a display. The photometer can be safely operated between 18 and 30 degrees centigrade (59 to 86 degrees Fahrenheit). Allow the instrument to come to the ambient temperature and protect it from direct sunlight. The HemoCue Hb 201+ analyzer has an internal electronic "SELFTEST". Every time the analyzer is turned on, it automatically verifies the performance of the optronic unit of the analyzer.

The photometer's black microcuvette holder has three operating positions: 1) pushed in, for measuring; 2) pulled out until "clicked," for placing the microcuvette; 3) completely withdrawn for cleaning.

Figure 2.4 HemoCue Hb201+ photometer

Clean the microcuvette holder daily and check for dirt or dried blood.
Follow these procedures to clean the microcuvette holder (Figure 2.5):

a) Check that the analyzer is turned off and the display window is blank.
b) Pull the cuvette holder out of its loading position. Carefully press the small catch positioned in the upper right corner of the cuvette holder.
c) While pressing the catch, carefully rotate the cuvette holder towards the left as far as possible. Carefully pull the cuvette holder away from the analyzer.
d) Clean the cuvette holder with HemoCue Cleaner. Optronic unit can be cleaned by pushing the swab into the opening of the cuvette holder. Move from side to side 5-10 times. If the swab is stained repeat cleaning with a new swab.

Figure 2.5 Cleaning microcuvette holder

[**Note:** For cleaning the microcuvette holder, a cotton tip swab moistened with alcohol and water may be used as an alternative to the HemoCue cleaner. It is important that the cuvette holder is completely dry prior to reinserting it in the photometer].

2.3 MATERIALS AND SUPPLIES FOR HIV TESTING

The following special equipment and supplies are used in the collection, storage and transport of the dried blood spot (DBS) samples.

- **Desiccants (drying agents)** (Figure 2.6). Desiccant packets, which absorb moisture from the air, are used to keep the materials used for collecting the DBS samples as dry as possible. Non-regeneratable desiccant packets are transparent packets in which the granules are visible. The granules change color as they absorb moisture. You should change the desiccants as indicated by the humidity indicator cards or when the packet has changed color.

Figure 2.6 Desiccants

- **Humidity indicator cards** (Figure 2.7). The non-regeneratable dessicant packets will turn color at the point of saturation. The humidity indicator card allows you to more closely monitor the level of moisture. This will enable you to add additional desiccant packets in conditions of high humidity.

There are three circles on the humidity indicator card. If the circle at the bottom of the card (labeled 30%) turns pink, it indicates a relatively high level of humidity and is a warning to begin to carefully monitor the humidity level. If the middle or top circles (labeled 40% and 50%, respectively) turns pink, you should replace the desiccant packets in the bag with fresh packets. Replace the humidity indicator card with a fresh card if the circles merge.

Figure 2.7 Humidity indicator card

- **Filter paper card** (Figure 2.8). You will use special filter paper cards to collect the blood samples. Each of the cards has five preprinted circles that contain approximately 100 µl blood when fully filled. You must fill at least **four** of the circles for the HIV testing.

Figure 2.8 Filter paper cards
(903 TM paper)

The preprinted circles of the filter paper cards must be kept clean and dry at all times as water, dust, sweat from your hands, or other environmental contaminants can affect the HIV test results. Thus, **you should use gloves at all times when handling the filter paper cards.**

The filter paper cards come in packets of 100 cards. When you need a new packet of filter paper cards, put on gloves first. Open the packet and place all cards in a large ziplock bag. They must be stored stacked so as to avoid compressing the filter paper. **Place a few non-regeneratable desiccant packets and a humidity indicator card in each bag before sealing it**. Later, if the humidity indicator card changes color, follow the above instructions. If you do not have humidity indicating cards and the crystals in the desiccant packets change color before you have used up all of the 100 filter paper cards, you should replace the desiccant packets with fresh packets.

Note: Keeping the unused filter paper cards with desiccants in a zip loc bag will prevent the moisture being absorbed on the filter paper card and this will in turn deter over-saturation or merging of circles when blood is being collected.

- **Bar code labels.** Because the HIV testing is anonymous, bar code labels will be used to identify the DBS samples. These peel-off, preprinted bar code labels are provided on special sheets. Each row on a sheet includes a number of labels with the same bar code. A different row on the sheet will be used for each respondent for whom a DBS sample is collected. Instructions for using the bar code labels are included in Chapter 6 of this manual.

- **Drying box.** After collection, the blood spot samples must be placed in a specially designed box where they will be stored overnight to dry. The plastic drying box has a cardboard paper drying rack that holds the sample filter paper cards in a horizontal position when the box is standing vertically. The plastic boxes are to be used for collection and overnight drying only. They are not intended for long-term sample storage. Pouches of non-regeneratable desiccants should be kept at all times at the bottom of the drying box (as it stands vertically) to hasten the drying process, particularly in high humidity environments. A humidity indicator card should be placed in the drying box to allow you to monitor the level of humidity.

- **Low gas-permeable bags (small ziplock bags).** You will be given a supply of special small ziplock bags to use for storing samples and supplies in the field. These bags are specially manufactured to reduce the exposure of their contents to air and moisture. These bags are expensive and should never be used for other purposes, like carrying food or a bunch of adhesive bandages. The bags have a sliding “zipper” that is used to close and seal the bag. Each morning you will transfer the DBS samples from the previous day’s fieldwork, which have dried overnight, to these bags (See Chapter 6).

- **Glassine paper.** Thin, glossy, semi-opaque paper squares. The glassine paper is used to protect the dried blood spots on the filter paper cards during storage.

- **Large ziplock bags.** A large ziplock bag will be provided to you for each of the NFHS-3 sample clusters in which you will work. These large ziplock bags will be used to hold the DBS samples from the cluster during storage and transport.

- **Clean plastic sheets.** Plastic sheets will be provided to put on the surface area where your supplies will be placed while you conduct the testing for Anaemia and collect blood spots for HIV antibody testing.

- **Plastic bags for biohazardous waste.** These are big bags that are provided to hold all the biohazardous waste materials during the day and will be discarded appropriately (see Chapter 8).

3 COMPLETING QUESTIONNAIRES AND OTHER TESTING DOCUMENTS

You will be responsible for the accurate recording of information that will be used to track the outcome of the testing procedures. Documents you will complete during the testing are:

- Height/Weight page for women, men and children in the Household Questionnaire, starting from column **(73)**.
- Haemoglobin and HIV Testing page for women, men and children in the Household Questionnaire.
- Anaemia Brochure.
- Anaemia Referral Slip for Severely Anaemic Respondents.
- Blood Sample Transmittal Sheet.
- Voucher for free VCT (Voluntary Counseling and Testing) services.
- Anaemia letter for local health facility

In addition, you will be provided with two kinds of informational brochures - one on Anaemia and one on HIV/AIDS – to be left with the households that you visit.

After the fieldwork and data entry and cleaning have ended, the HIV Testing page, which includes the unique barcode assigned to the respondent's HIV blood sample, will be removed from the questionnaire in the central office and destroyed. This is to ensure the anonymity of the HIV test results. It will be impossible to identify which respondent gave a particular blood sample for testing once the page is removed and destroyed.

This chapter reviews the various tasks that are associated with using these various materials. The key tasks include:

- Identifying eligible respondents.
- Obtaining informed consent for the testing.
- Recording information relevant to the outcome of the testing in the Household Questionnaire and other tracking documents.
- Providing Anaemia and HIV/AIDS informational brochures and written referrals for severe Anaemia follow-up, as appropriate.

Specific activities that are involved in performing these tasks are described in detail below.

3.1 IDENTIFYING ELIGIBLE RESPONDENTS

The first step in the testing process will be to identify members of the household who are eligible for Height and Weight Measurements, Anaemia and HIV testing. For all eligible women (age 15-49 years), eligible men (age 15-54 years) and children born in 2001 or later, information relating to measurement of height and weight will be recorded on the **Height and Weight section** (Figure 3.1) found in the Household Questionnaire. For all eligible women (age 15-49 years), eligible men (age 15-54 years) and children born in 2001 or later who are at least six months old, information relating to Anaemia testing will be recorded on the **Anaemia Testing section** (Figure 3.2) found in the Household Questionnaire. For eligible women (age 15-49 years) and men (age 15-54 years), information relating to HIV testing will be recorded on the **HIV Testing section** (Figure 3.5) found in the Household Questionnaire.

In the high HIV prevalence states (Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu, Manipur, Nagaland, and in Uttar Pradesh), all women age 15-49 years, men age 15-54 years and children born in 2001 or later and at least six months old are eligible for Anaemia testing from the sampled households. HIV testing will be performed on all women 15-49 years and men 15-54 years in the sampled households in the high HIV prevalence states and Uttar Pradesh. In other states, all women age 15-49 years and children born in 2001 or later and at least six months old

will be tested only for anaemia in the sampled households. However, anaemia and HIV testing for men 15-54 years age will be performed in a sub-sample of households. Similarly, HIV testing in women 15-49 years will also be performed in half of the sampled households. As explained earlier, the line number, name, and age of eligible individuals should have been recorded in Columns **(69)** (see Figures 3.1).

It is responsibility of the interviewer to identify and record all the eligible respondents for height, weight and biomarker measurement. Health Investigators will get the household questionnaire with information filled in columns (69) to (72C) by the interviewer. However, Health Investigators should verify the information in columns (69) to (71) by reviewing the following from the Household Schedule:

- Column (1) Line number
- Column (2) Name
- Column (4) Sex of household member
- Column (7) Age of household member
- Column (9) Identification of eligible women, (women age 15-49)
- Column (10) Identification of eligible men, (men age 15-54)
- Column (11) Identification of eligible children, (children under age 6)
  Note that children age 0-5 months will be measured for length and weight but not tested for Anaemia.

HOUSEHOLD SCHEDULE

Now we would like some information about the people who usually live in your household or who are staying with you now.

LINE NO.	USUAL RESIDENTS AND VISITORS	RELATIONSHIP TO HEAD OF HOUSEHOLD	SEX	RESIDENCE		AGE	MARITAL STATUS	ELIGIBILITY			BIRTH REGIS-TRATION
	Please give me the names of the persons who usually live in your household and guests of the household who stayed here last night, starting with the head of the household.	What is the relationship of (NAME) to the head of the household? (A)	Is (NAME) male or female?	Does (NAME) usually live here?	Did (NAME) stay here last night?	How old is (NAME)? (B)	**IF AGE 10 OR OLDER** What is the current marital status of (NAME)? (C)	CIRCLE LINE NUMBER OF ALL WOMEN AGE 15-49	CIRCLE LINE NUMBER OF ALL MEN AGE 15-54	CIRCLE LINE NUMBER OF ALL CHILDREN UNDER AGE 6	**IF AGE 0-4** Does (NAME) have a birth certificate? IF NO: (NAME)'s birth ever been regis-tered with the civil authority?(D)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
01			M F 1 2	YES NO 1 2	YES NO 1 2	IN YEARS		01	01	01	C R N DK 1 2 3 8
02			1 2	1 2	1 2			02	02	02	1 2 3 8

The cutoff levels for Anaemia vary for pregnant women and non-pregnant women. Hence, this information will also be recorded for female respondents in Column (72B) by the interviewer, and given to you. This information can be verified from the Woman's Questionnaire, if available, by checking her response to Q.227.

FIGURE 3.1 HEIGHT AND WEIGHT MEASUREMENT

WEIGHT, HEIGHT AND BIOMARKER MEASUREMENT

CHECK COLUMNS (9), (10), AND (11): RECORD THE LINE NUMBER, NAME, AND AGE OF ALL WOMEN AGE 15-49 AND CHILDREN UNDER AGE 6. IF THE HOUSEHOLD IS SELECTED FOR MEN'S INTERVIEWS, ALSO RECORD THE LINE NUMBER, NAME, AND AGE OF ALL MEN AGE 15-54.

WOMEN 15-49					WEIGHT AND HEIGHT MEASUREMENT OF WOMEN 15-49			
LINE NO. FROM COL. (9)	NAME FROM COL. (2)	AGE FROM COL. (7)	NEVER MARRIED CHECK COL.(8): IS COL. (8) =7?	CURRENTLY PREGNANT CHECK Q.227 IN WOMAN'S QUESTIONNAIRE	WEIGHT (KILOGRAMS)	HEIGHT (CENTIMETERS)	MEASURED LYING DOWN OR STANDING UP	RESULT 1 MEASURED 2 NOT PRESENT 3 REFUSED 6 OTHER
(69)	(70)	(71)	(72A)	(72B)	(73)	(74)	(75)	(76)
		YEARS	YES NO 1 2	YES NO/DK 1 2	.	.		
			1 2	1 2	.	.		
			1 2	1 2	.	.		

MEN 15-54				WEIGHT AND HEIGHT MEASUREMENT OF MEN 15-54			
LINE NO. FROM COL. (10)	NAME FROM COL. (2)	AGE FROM COL. (7)	NEVER MARRIED CHECK COL. (8): IS COL.(8) =7?	WEIGHT (KILOGRAMS)	HEIGHT (CENTIMETERS)		RESULT 1 MEASURED 2 NOT PRESENT 3 REFUSED 6 OTHER
(69)	(70)	(71)	(72A)	(73)	(74)		(76)
		YEARS	YES NO 1 2	.	.		
			1 2	.	.		
			1 2	.	.		

CHILDREN UNDER AGE 6				WEIGHT AND HEIGHT MEASUREMENT OF CHILDREN BORN IN 2001 OR LATER			
LINE NO. FROM COL. (11)	NAME FROM COL. (2)	AGE FROM COL. (7)	What is (NAME'S) date of birth?*	WEIGHT (KILOGRAMS)	HEIGHT (CENTIMETERS)	MEASURED LYING DOWN OR STANDING UP	RESULT 1 MEASURED 2 NOT PRESENT 3 REFUSED 6 OTHER
(69)	(70)	(71)	(72C)	(73)	(74)	(75)	(76)
			DAY MONTH YEAR	0 .	.	LYING STAND. 1 2	
				0 .	.	1 2	
				0 .	.	1 2	
				0 .	.		

For women, verify that the line number, name, and age of all women age 15 to 49 are listed in Columns (69-71) of the Height and Weight Section. For men, verify that the line number, name, and age of all men age 15 to 54 are also listed in Columns (69-71) of the Height and Weight Section.

For children, verify that an exact date of birth (day/month/year) for all children under age six has been recorded in Column (71) on the Height and Weight Section. For children whose mother has been interviewed in the survey, the month and year of the child's birth will be taken from the mother's birth history recorded in the Woman Questionnaire, while the day of birth must be obtained separately from the mother when filling in the Height and Weight Section. For children whose mother has not been interviewed, the full date of birth must be obtained from another responsible adult in the household.

The following are important points to keep in mind when identifying eligible respondents and completing this information:

1) **All women and men who fit the appropriate age categories are eligible for testing, whether they are usual residents in a household or visitors.** If you have any questions about a woman's or a man's eligibility to be tested, ask the team supervisor.

2) **In principle, eligible consenting respondents should be tested after their individual interview has been completed.**

3) **Never alter any responses on the Household Questionnaire without consulting the interviewer.** For example, you may be a health investigator collecting DBS from a male respondent (after the male interview), while a female interviewer on your team conducted the Household/Woman's interview. Even in cases where there are concerns about an individual's eligibility for testing, proceed with the Anaemia testing and/or HIV test blood sample collection. Record in the comments section of the Household Questionnaire a description of the problem. Provide as many details as possible. The field organization/central office will decide later what will be done about the test results for the respondent in question.

3.2 OBTAINING INFORMED CONSENT FOR THE TESTING

One of the primary tasks before testing is to explain the purpose of the testing to eligible respondents or, in the case of children, to the parent/responsible adult, and to obtain their consent before collecting any blood samples. In order to ensure that these individuals can make an 'informed' decision about the testing, the NFHS-3 questionnaire includes statements which you will read as appropriate. These 'informed consent' statements (Figures 3.2 and 3.3) include the following basic elements:

(1) a description of the objectives of the test
(2) basic information on how the test will be conducted
(3) assurances about the confidentiality of the results
(4) a specific request for permission to collect the sample.

You must read the informed consent statements to each eligible respondent age 18 and over and obtain the respondent's consent to the testing before any blood collection is done. The approaches for obtaining consent differ slightly when the eligible respondent is a child (born in 2001 or later) or a youth (15-17 years old). In most instances, if the respondent is a child or a youth, you must first obtain the consent of one of the respondent's parents, or, in the absence of a parent, the consent of another responsible adult who is at least 18 years of age. For respondents age 15-17, after obtaining consent from the parent/responsible adult, you must read the consent statement to the youth. The only exceptions are if the youth is married or if the youth lives alone or in a household in which there are no adults. In such cases, the consent of the youth is sufficient.

In all cases, you must record the outcome of the consent request with your signature before performing the test on a respondent.

For Anaemia testing **of children**, the following information must be recorded on the Haemoglobin and HIV Testing Page:

- **Column (77):** Record information from Column (72 C) on the child's date of birth;
- **Column (78)**: Record the line number of the parent/responsible adult whose consent for the testing will be requested;
- **Column (79)**: Record whether the parent/responsible adult consent to the test and record your signature as a witness.

<u>You must sign your name to indicate that you read the consent statement to the parent/responsible adult in the case of children and have recorded their response accurately.</u>

The informed consent process for the Anaemia and HIV testing **for youths** involves several steps. The following information must be recorded on the Haemoglobin and HIV Testing Page:

- **Column (77**): Verify the age of the respondent. As noted above, if the respondent is age 15-17 and not married or not living independently, circle the appropriate code in **Column (77).** You must obtain permission from his/her parent/responsible adult before seeking the respondent's own consent for the testing.
- **Column (78):** For respondents age 15-17, record the line number of the parent/responsible adult whose consent for the testing will be requested.

Record whether the parent/responsible adult consents to the Anaemia test in **Column (79)** and/or the HIV test in **Column (80)**. You must sign your name to indicate that you read the consent statement to the parent/responsible adult in the case of non-married, non-independent youths and have recorded their response accurately.

For youths for whom adult consent has been obtained and for adults and married or independent youths, the following information must be recorded on the Haemoglobin and HIV Testing Page:

- Record whether the respondent consents to the Anaemia test in **Column (79)** and/or the HIV test in **Column (80)**.

FIGURE 3.2: INFORMED CONSENT FOR ANAEMIA TESTING

As part of this survey, we are studying anaemia among women, men, and children under age 6 years. Anaemia is a serious health problem that usually results from poor nutrition, infection, or chronic disease. This information will assist the government to develop programmes to prevent and treat anaemia.

We request that (you/you and (NAME OF RESPONDENT'S CHILD(REN)/CHILD(REN) IN RESPONDENT'S CARE) born in 2001 or later participate in the anaemia testing part of this survey by giving a few drops of blood from a finger. The test uses disposable sterile instruments that are clean and completely safe. The blood will be tested with new equipment and the results of the test will be given to you immediately. The results will be kept confidential.

Do you have any questions?
ANSWER ANY QUESTIONS AND ADDRESS RESPONDENT'S/GUARDIAN'S CONCERNS.

May I now ask that (you/you and NAME OF RESPONDENT'S CHILD(REN)/CHILD(REN) IN RESPONDENT'S CARE) participate in the anaemia testing. However, if you decide not to have the test(s) done, it is your right and we will respect your decision. Now please tell me if you agree to have the test(s) done.

GO TO COLUMN 79, CIRCLE THE APPROPRIATE CODE, AND SIGN.

IF RESPONDENT IS AGE 15-17 AND NEVER MARRIED, ASK PARENT/GUARDIAN:
Now, will you tell me if you accept that (NAME OF YOUTH(S)) participate in the anaemia testing? GO TO COLUMN 78 AND WRITE THE LINE NUMBER OF THE PARENT/GUARDIAN. ASK FOR THEIR CONSENT. IF THE PARENT/GUARDIAN DOES NOT AGREE, CIRCLE CODE '2' IN COLUMN 79 AND SIGN. IF THE PARENT/GUARDIAN AGREES, READ THE PRECEDING PARAGRAPHS TO THE YOUTH FOR HIS/HER CONSENT, RECORD THE APPROPRIATE CODE IN COLUMN 79, AND SIGN. CIRCLE CODE '1' FOR 'GRANTED' ONLY IF BOTH THE PARENT/GUARDIAN AND THE YOUTH AGREE TO THE TESTING.

FIGURE 3.3:INFORMED CONSENT FOR HIV TEST FOR MEN AND WOMEN

In addition to studying anaemia, we are also studying HIV. HIV is the virus that causes AIDS.

In order to determine how prevalent HIV is in India, we are asking women and men throughout India to give a few drops of blood. The drops of blood will be collected from your finger (at the same time as we do your anaemia test) and sent to a laboratory for testing. To ensure complete confidentiality of the collected blood, no individual names will be attached to the blood sample. This means that no one, including me, will be able to trace the blood sample or the test result back to you. Since we are only collecting blood on a filter paper with no other identifiying information, we cannot give you the result of the HIV test.

However, whether or not you choose to particpate in this effort to estimate the prevalence of HIV in India, you will be given a voucher for a free HIV test at a health clinic where you can get your blood tested for HIV if you want and receive your results.

Do you have any questions?
ANSWER ANY QUESTIONS AND ADDRESS RESPONDENT'S CONCERNS.

I hope you will agree to give a few drops of blood from your finger for this very important country-wide effort, as it will help the government to develop programmes to prevent the spread of HIV and AIDS. However, if you decide not to participate, it is your right and we will respect your decision.

Do you agree to give a few drops of blood for anonymous HIV testing?

GO TO COLUMN 80 AND CIRCLE THE APPROPRIATE CODE AND SIGN.

IF RESPONDENT IS AGE 15-17 AND NEVER MARRIED, ASK THE PARENT/GUARDIAN:
Now, will you tell me if you accept that (NAME OF YOUTH(S)) participate in the HIV testing?
IF THE PARENT/GUARDIAN DOES NOT AGREE, CIRCLE CODE '2' IN COLUMN 80 AND SIGN. IF THE PARENT/GUARDIAN AGREES, READ THE PRECEDING PARAGRAPHS TO THE YOUTH FOR HIS/HER CONSENT, RECORD THE APPROPRIATE CODE IN COLUMN 80, AND SIGN. CIRCLE CODE '1' FOR 'GRANTED' ONLY IF BOTH THE PARENT/GUARDIAN AND THE YOUTH AGREE TO THE TESTING.

The following are some key points to remember in obtaining consent for the testing:

1. **Read the applicable consent statements to each eligible respondent exactly as they appear in the questionnaire**. When you arrive at the household and begin talking about the blood tests with an eligible respondent, you may informally discuss many of the items included in the informed consent statement. However, before beginning the testing with any respondent, you must still read the informed consent statements exactly as they are worded in the questionnaire. If you feel that the respondent may find the statements repetitive, tell him/her that you are required to formally read the statement to ensure that respondents are given all the appropriate information.

2. The only exception that is allowable is in cases when you have already requested consent for testing from an adult who also happens to be the parent or other responsible adult who must give consent to test a youth in the household. In such cases, you can simply ask the parent/responsible adult: "Do I also have your permission for (NAME OF YOUTH) to participate in the study?"

3. **Be sure that you read the informed consent statements clearly.** Practice reading the consent statements so that you become comfortable reading them in a clear, natural manner. Avoid using a monotone tone when reading the statements or reading them so rapidly that they cannot be understood.

4. **For adults and youths, always request consent for the Anaemia and HIV tests separately.** Be sure the respondent knows that it is possible to consent to one test and not to the other. Since the outcome of the consent process may differ for the two tests, it is important that you accurately record the results for both the Anaemia and HIV test in the appropriate columns.

5. **Never collect blood from an unmarried youth (15-17 years) before obtaining the consent of the parent/responsible adults** unless the youth lives alone or in a household where there are no adult members.

6. **Never attempt to force or coerce consent.** It may take tact and patience to overcome people's fears about having blood collected for testing. Take your time in trying to convince respondents who are uncertain about the testing to grant their consent. Some respondents may have questions or want to discuss the procedures before giving consent. Patiently respond to all questions.

7. Some respondents from whom you are seeking consent may be reluctant to allow any testing without consulting someone not present at the time of your visit (such as a woman who may want to consult her husband before giving permission). **In such cases, make an appointment to return to the household later at an agreed upon time.** If you believe it will help, ask the team supervisor to visit a household where eligible respondents express fear or reluctance to be tested.

3.3 RECORDING INFORMATION ON THE TEST SCHEDULES

Information relevant to the outcome of the testing process must also be recorded in the test schedules (see Figure 3.4 and 3.5). The following summarizes the procedures for recording this information, first for children and then for adults and youths.

Recording Information on Anaemia Testing for Children

The following describes the procedures that you should follow in recording information on the results for the Anaemia testing for children on the Anaemia Testing Page in the Household Questionnaire:

- **Column (81)**: The haemoglobin level will be recorded in grams per deciliter (g/dl) from the digital readout on the HemoCue (see Chapter 5).

- **Column (82)**: Record the result of the Anaemia test in Column (82); record '1' if the child was successfully tested, '2' if the child was not present at the time the health investigator visited the house for testing, and '3' if the parent/responsible adult did not allow the child to be tested. Use code '6' if you were unable to test the child for other reasons (e.g., the child was too sick) and specify the reason in the margin.

FIGURE 3.4: ANAEMIA TESTING IN CHILDREN

HAEMOGLOBIN MEASUREMENT OF CHILDREN BORN IN 2000 OR LATER					
CHECK COLUMN (72C): CHILD BORN IN MONTH OF INTERVIEW OR PREVIOUS 5 MONTHS?	LINE NO. OF PARENT/ RESPONSIBLE ADULT. RECORD '00' IF NOT LISTED IN HOUSEHOLD SCHEDULE.	READ CONSENT STATEMENT TO PARENT/RESPONSIBLE ADULT. CIRCLE CODE (AND SIGN)		HAEMOGLOBIN LEVEL (G/DL)	HAEMOGLOBIN RESULT 1 MEASURED 2 NOT PRESENT 3 REFUSED 6 OTHER
(77)	(78)	(79)		(81)	(82)
YES 1 → NEXT CHILD NO 2		GRANTED 1 SIGN _____ REFUSED 2 NEXT LINE		.	
1 → NEXT CHILD 2		1 SIGN _____ 2 NEXT LINE		.	
1 → NEXT CHILD 2		1 SIGN _____ 2 NEXT LINE		.	
1 → NEXT CHILD 2		1 SIGN _____ 2 NEXT LINE		.	
1 → NEXT CHILD 2		1 SIGN _____ 2 NEXT LINE		.	
1 → NEXT CHILD 2		1 SIGN _____ 2 NEXT LINE		.	

Recording Information on Anaemia and HIV Testing for Eligible Women, Men, and Youths

The following describes the procedures that you should follow in recording information on the results for Anaemia and HIV testing for eligible women, men, and youths on the Anaemia Testing Page and HIV Testing Page and the Blood Sample Transmittal Sheet

To ensure that the testing process is accurately documented for each eligible respondent, it is important that you fill in all of the relevant items in these documents ***in the following sequence***:

If all necessary consents have been obtained for HIV testing, you will:

- **Assign HIV blood sample bar code.** Each respondent who consents to the HIV testing will be assigned a unique identification number from the sheet of preprinted bar code labels you will be provided. The labels come in sets of four across a sheet.

  Paste the first bar code label in **Column (84)** of the Anaemia and HIV Testing Section. Paste the second bar code label with the same unique identification number on the filter paper card you will use to collect the blood sample from the respondent. Paste the third bar code label with the same unique identification number on the blood transmittal sheet (Figure 3.6). This sheet will provide a record of all the blood samples collected in a cluster for HIV testing.

  It is extremely important to make sure that the label is put on the row on the HIV Testing Page that corresponds to the respondent from whom you will be collecting the blood sample. Do not attempt to peel an incorrect label off of any form or filter paper card. If you make a mistake with the labels, use the next complete set of labels and paste them over the incorrect ones.

[More detail on this procedure is provided in Chapter 6, which describes the process of collecting blood for the Anaemia and HIV tests].

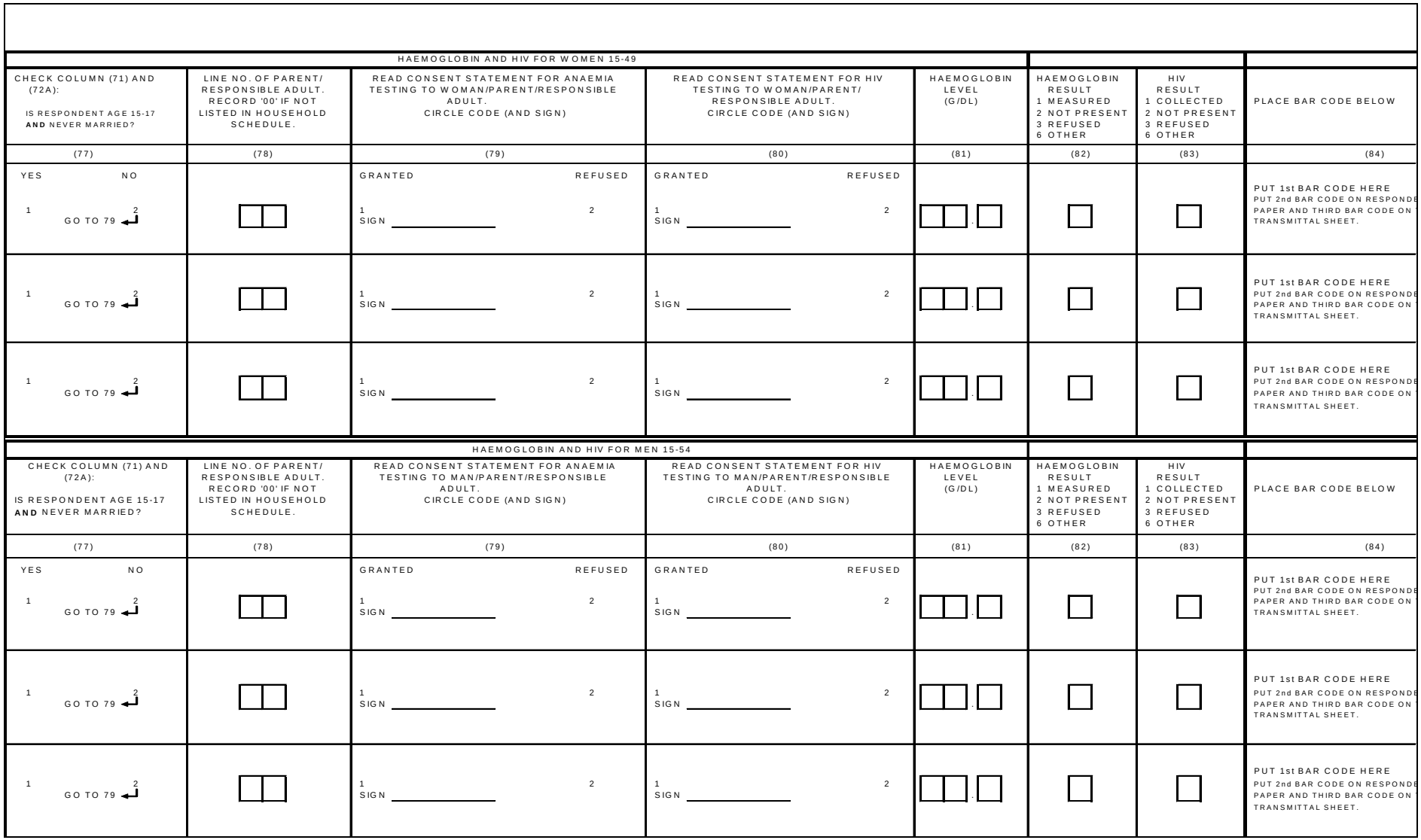
If all necessary consents have been obtained for Anaemia testing, you will:

- **Record haemoglobin level**. Record the haemoglobin level from the digital readout on the HemoCue in grams per deciliter (g/dl) in **Column (81)** of the Anaemia Testing Section**.** Check carefully to be sure you are using the correct row for the respondent before entering the value.

For all eligible adult and youth respondents, you will:

- **Record the final outcome of the Anaemia testing**. Record the final outcome of the Anaemia test in **Column (82).** Record '1' if the respondent was successfully tested, '2' if the respondent was not present at the time you visited the house for testing, and '3' if the respondent (or the parent/responsible adult for respondents age 15-17) refused consent for the testing. Use code '6' for other reasons (e.g., the respondent was too drunk or otherwise incapacitated) and specify the reason in the margin.

FIGURE 3.5: ANAEMIA AND HIV TESTING - WOMEN AND MEN



HAEMOGLOBIN AND HIV FOR WOMEN 15-49

CHECK COLUMN (71) AND (72A): IS RESPONDENT AGE 15-17 **AND** NEVER MARRIED?	LINE NO. OF PARENT/ RESPONSIBLE ADULT. RECORD '00' IF NOT LISTED IN HOUSEHOLD SCHEDULE.	READ CONSENT STATEMENT FOR ANAEMIA TESTING TO WOMAN/PARENT/RESPONSIBLE ADULT. CIRCLE CODE (AND SIGN)	READ CONSENT STATEMENT FOR HIV TESTING TO WOMAN/PARENT/ RESPONSIBLE ADULT. CIRCLE CODE (AND SIGN)	HAEMOGLOBIN LEVEL (G/DL)	HAEMOGLOBIN RESULT 1 MEASURED 2 NOT PRESENT 3 REFUSED 6 OTHER	HIV RESULT 1 COLLECTED 2 NOT PRESENT 3 REFUSED 6 OTHER	PLACE BAR CODE BELOW
(77)	(78)	(79)	(80)	(81)	(82)	(83)	(84)
YES 1 / NO 2 GO TO 79		GRANTED 1 SIGN ____ / REFUSED 2	GRANTED 1 SIGN ____ / REFUSED 2	.			PUT 1st BAR CODE HERE PUT 2nd BAR CODE ON RESPONDE PAPER AND THIRD BAR CODE ON TRANSMITTAL SHEET.
1 / 2 GO TO 79		1 SIGN ____ / 2	1 SIGN ____ / 2	.			PUT 1st BAR CODE HERE PUT 2nd BAR CODE ON RESPONDE PAPER AND THIRD BAR CODE ON TRANSMITTAL SHEET.
1 / 2 GO TO 79		1 SIGN ____ / 2	1 SIGN ____ / 2	.			PUT 1st BAR CODE HERE PUT 2nd BAR CODE ON RESPONDE PAPER AND THIRD BAR CODE ON TRANSMITTAL SHEET.

HAEMOGLOBIN AND HIV FOR MEN 15-54

CHECK COLUMN (71) AND (72A): IS RESPONDENT AGE 15-17 **AND** NEVER MARRIED?	LINE NO. OF PARENT/ RESPONSIBLE ADULT. RECORD '00' IF NOT LISTED IN HOUSEHOLD SCHEDULE.	READ CONSENT STATEMENT FOR ANAEMIA TESTING TO MAN/PARENT/RESPONSIBLE ADULT. CIRCLE CODE (AND SIGN)	READ CONSENT STATEMENT FOR HIV TESTING TO MAN/PARENT/RESPONSIBLE ADULT. CIRCLE CODE (AND SIGN)	HAEMOGLOBIN LEVEL (G/DL)	HAEMOGLOBIN RESULT 1 MEASURED 2 NOT PRESENT 3 REFUSED 6 OTHER	HIV RESULT 1 COLLECTED 2 NOT PRESENT 3 REFUSED 6 OTHER	PLACE BAR CODE BELOW
(77)	(78)	(79)	(80)	(81)	(82)	(83)	(84)
YES 1 / NO 2 GO TO 79		GRANTED 1 SIGN ____ / REFUSED 2	GRANTED 1 SIGN ____ / REFUSED 2	.			PUT 1st BAR CODE HERE PUT 2nd BAR CODE ON RESPONDE PAPER AND THIRD BAR CODE ON TRANSMITTAL SHEET.
1 / 2 GO TO 79		1 SIGN ____ / 2	1 SIGN ____ / 2	.			PUT 1st BAR CODE HERE PUT 2nd BAR CODE ON RESPONDE PAPER AND THIRD BAR CODE ON TRANSMITTAL SHEET.
1 / 2 GO TO 79		1 SIGN ____ / 2	1 SIGN ____ / 2	.			PUT 1st BAR CODE HERE PUT 2nd BAR CODE ON RESPONDE PAPER AND THIRD BAR CODE ON TRANSMITTAL SHEET.

- **Record the final outcome of the HIV testing**. Record the final outcome of the HIV test in **Column (83),** using the same codes as for the Anaemia test outcome. Use code ‘6’ if you have technical problems.

FORM 5 (FRONT)

BLOOD SAMPLE TRANSMITTAL SHEET

STATE NUMBER	PSU NUMBER	PLACE NAME

FOLD AND KEEP SHEET IN LARGE ZIP-LOCK BAG WITH SAMPLES
UNTIL FINAL SIGNATURE HAS BEEN OBTAINED

FORM 5

PERSON SENDING/ RECEIVING SAMPLES	TIME TO FILL IN FORM	TOTAL COUNT OF BLOOD SAMPLES	SIGNATURE (CONFIRMING THAT EACH SAMPLE IS PRESENT—SEE BACK OF FORM)	SIGNATURE (CONFIRMING THAT THE NUMBER OF BLOOD SAMPLES MATCHES COL. 3)	DATE	NOTES (NOTE ANY DISCREPANCY IN NUMBERS OF SAMPLES)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
HEALTH INVESTIGATOR/ SUPERVISOR	WHEN PSU IS COMPLETED					
SAMPLE PICK UP VEHICLE/ PERSON INCHARGE	WHEN SAMPLES ARE PICKED UP IN FIELD					
RECEIVER AT THE BLOOD COLLECTION CENTRE	UPON ARRIVAL AT THE BLOOD COLLECTION CENTRE					
RECEIVER AT RANBAXY	UPON ARRIVAL AT THE RANBAXY LABORATORY					

INSTRUCTIONS

HEALTH INVESTIGATOR: Upon completion of a PSU, verify that the unique bar code (identification) number on each blood sample (filter paper card) collected and stored in the large zip-lock bag labeled with that PSU number corresponds to a bar code number pasted to the back of this transmittal sheet and vice-versa. Note any discrepancies in Column (7). Count and record the total number of blood samples in Column (3). Sign your name in Column (4) and the date in Column (6). Fold and store this transmittal sheet in the large zip-lock bag.

FIELD TEAM SUPERVISOR: After the technician has verified the blood samples, you will conduct a second verification. Verify that the unique bar code (identification) number on each blood sample (filter paper card) collected and stored in the large zip-lock bag labeled with that PSU number corresponds to a bar code number pasted to the back of this transmittal sheet and vice-versa. Note any discrepancies in Column (7). Count and verify the total number of blood samples in Column (3). Sign your name in Column (5) and the date in Column (6). Refold and store this transmittal sheet in the large zip-lock bag.

SAMPLE PICK UP PERSON: Before returning to the sample collection centres after visiting a team in the field, you will verify the number of blood samples collected in each completed PSU that you are carrying back with you. For each completed PSU, count and record the total number of blood samples stored in the large zip-lock bag labeled with that PSU number in Column (3). Note any discrepancies in Column (7). Sign your name in Column (5) and the date in Column (6). Refold and store this transmittal sheet in the large zip-lock bag.

RECEIVER AT THE COLLECTION CENTRE: For each large zip-lock bag arriving from the field, you will verify the number of blood samples received. Count and record the total number of blood samples stored in the large zip-lock bag labeled with the PSU number in Column (3). Note any discrepancies in Column (7). Sign your name in Column (5) and the date in Column (6). Photocopy both sides of this transmittal sheet and file the photocopies (as instructed) in a designated, locking file cabinet. Refold and store the original transmittal sheet in the large zip-lock bag. Follow the Ranbaxy protocol for sending blood samples to the Ranbaxy Lab in Mumbai.

RECEIVER AT THE RANBAXY LAB: Upon receiving blood samples from the Blood collection centres, verify that the unique bar code (identification) number on each blood sample (filter paper card) collected and stored in the large zip-lock bag labeled with the PSU number corresponds to a bar code number pasted to the back of this transmittal sheet and vice-versa. Note any discrepancies in Column (7). Count and record the total number of blood samples in Column (3). Sign your name in Column (4) and the date in Column (6). Photocopy both sides of this transmittal sheet after signing and dating. Send the photocopies (as instructed) to the office of the Research Organization. Follow the NFHS-3/ Ranbaxy lab protocol for storing and processing blood samples.

Note: this form will be destroyed under the direction of the Lab Director after all blood samples have been completely processed and a Final HIV Test Result has been determined for each usable sample.

FORM 5 (back)

BLOOD SAMPLE TRANSMITTAL SHEET

STATE NUMBER	PSU NUMBER	HEALTH INVESTIGATOR NUMBER

NO.	SAMPLE BAR CODE	TECH.	LAB	NO.	SAMPLE BAR CODE	TECH.	LAB
1				10			
2				11			
3				12			
4				13			
				Fold here			
5				14			
6				15			
7				16			
8				17			
9				18			

3.4 PROVIDING HAEMOGLOBIN RESULTS AND VCT INFORMATION

Providing Haemoglobin Results

Before leaving the household, you will fill the appropriate Anaemia brochure with the results of the haemoglobin measurement for each child, woman, or man for whom an Anaemia test was completed. When reporting the results, circle the appropriate category for each person and briefly explain what the person's haemoglobin reading means. If an eligible respondent is identified to be suffering from anaemia (mild, moderate, or severe), go through the anaemia brochure with them (or their parents/responsible adults).

Since severe Anaemia is a life threatening condition, you will further advise the respondents (or their parents/responsible adults) who are found to be severely anaemic to go to a health facility for follow-up medical attention. For each respondent with haemoglobin level less than 7 g/dl, you will fill out an Anaemia Referral Slip, which will include the measured haemoglobin level.

FIGURE 3.7 EXAMPLE OF AN ANAEMIA REFFERAL SLIP*

NATIONAL FAMILY HEALTH SURVEY, 2005-06

During the National Family Health Survey (NFHS-3, 2006), Ms./Mr./child _____ , age __ __ years, was tested for Anaemia on __ __/__ __/__ __. His/her level of haemoglobin was __ __ . __ g/dl, which indicates he/she is seriously anemic. This person needs medical attention to treat the Anaemia.

** You will use a referral slip designed by NFHS-3 Survey.*

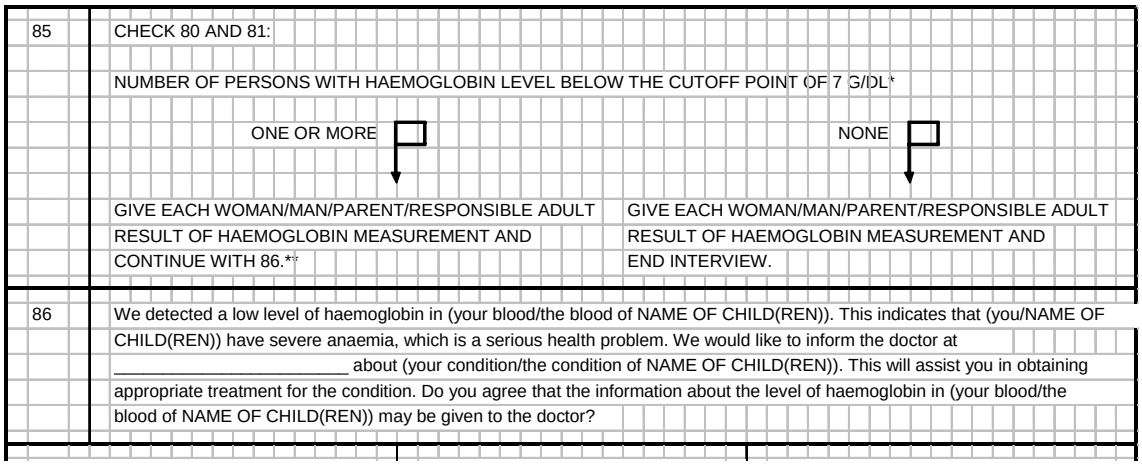
Q.85 in the Household Questionnaire is designed to help you screen for any respondent with haemoglobin level less than 7 g/dl, categorized as severely anaemic.

- Filter for low levels of haemoglobin. **In Q.85**, mark the box on the left if any person in the household has a haemoglobin level below 7 g/dl.

- Statement for Severe Anaemia (see Figure 3.7). For each respondent (or his/her parent/responsible adult) whose haemoglobin level is lower than 7 g/dl, read the statement in **Q.86** about the importance of severe Anaemia and recommend that they visit a health facility for the medical attention.

- Anaemia referral letter for PSU: When you meet the team supervisor, provide him/her with the names of the respondents with haemoglobin levels less than 7 g/dl who agree to referral, so that their names can be added to the Anaemia referral letter for that PSU.

FIGURE 3.8: ANAEMIA REFFERAL



Providing VCT (Voluntary Counseling and Testing) Information

An informational brochure on HIV/AIDS must be left with the household after all of the testing is completed. In addition, vouchers (for free HIV VCT services) distributed by NFHS-3 should be provided to the respondents eligible for HIV testing, regardless of whether they agree or refuse to give blood for HIV testing. Make sure to give the address of the nearest VCT centre to the respondent.

4 GENERAL PROCEDURES FOR COLLECTING CAPILLARY BLOOD DROP SAMPLES

Capillary blood can be obtained from the palm side of the end of a finger or from a heel. For adults and children six months of age and older, a finger should be used. However, if a child 6-11 months of age is undernourished and skinny, the underlying tissue can be very thin and a lancet is likely to pierce the bone. For such children, a heel puncture is recommended.

4.1 STEPS IN OBTAINING CAPILLARY BLOOD FROM THE FINGER

The following describes the steps that are involved in obtaining a capillary blood drop sample from the finger. They apply to both the collection of samples from adults and from children six months of age and older.

Step 1 Complete General Preparation

a) If possible, find an indoor site to encourage privacy. If possible, the site should have a table or other piece of furniture with a flat surface where you can lay out the supplies. A couch, bed or mat should be readily available if the respondent feels faint and needs to lie down.

   If you find you must do the test outdoors, find a site in the full shade and away from rain, dust, and other environmental elements that might affect the sample.

b) Take out a clean **plastic sheet** and spread it over a flat surface where you will lay out your supplies.

c) Refer to the testing pages for children and adults in the Household Questionnaire and confirm the number of eligible respondents for whom blood samples will be collected. After you have established the number of respondents to test, take out the appropriate equipment and supplies (Table 4.1). You will want to have all materials in easy reach when you begin collecting blood samples from the respondents.

Table 4.1
Equipment and Supplies Needed

For the Finger Prick
Retractable lancets for adults
Retractable lancets for children
Latex gloves
Alcohol swaps
Sterile gauze pads
Bandaids

For the Anaemia Testing
HemoCue microcuvettes
HemoCue photometer

For the HIV Testing
Filter paper cards
Bar code labels
Drying box

Other supplies/equipment:
Clean plastic sheet
Plastic bags for waste

d) When and where possible, wash and dry your hands. **Put on gloves** before beginning the collection of the blood sample from the first respondent.

e) If the respondent is a child, describe to the parent/responsible adult exactly what will be done during the collection of the blood sample and how they can assist, e.g., holding the child on their lap and holding the child's hand during the collection of the sample. The child may be fearful or anxious about what is going to happen, so using calm reassuring manner is important as you begin to collect the blood sample. Remember that nonverbal communication is important, e.g., maintain eye contact with the child as you prepare to take the sample.

Step 2 Select and Prepare the Puncture Site

a) **If the hand is cold, warm the skin** over the puncture site by rubbing it. This will increase blood flow by reducing tissue fluid and will improve the ease with which a sample can be obtained.

b) It is usually easier if you **sit on the side of the respondent opposite to the hand** that you will collect blood from. For example, if you want to collect the specimen from the left hand, place yourself to the right side of the respondent.

c) **Use the third or fourth finger** for collecting the blood (Figure 4.1). Do not use a finger with a scar, a wound or cut, an infection, swelling, a deformity, or a rash. Also, do not use a finger on which the respondent is wearing a ring, because the ring may disrupt the free flow of blood to the tip of the finger.

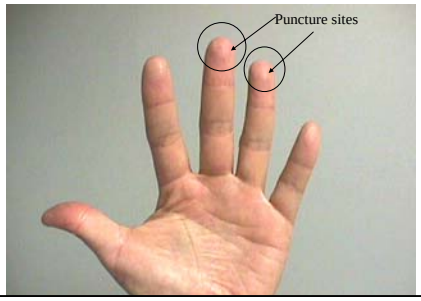


Figure 4.2 Clean the finger

d) **With an alcohol swab, clean the skin of the finger** thoroughly (Figure 4.2). If the skin is very dirty, use a second swab. Allow the alcohol to air dry. Do not blow on the area to dry the alcohol. Blowing may allow bacteria to contaminate the site.

e) **Ensure that the correct size lancet is easily accessible**. For adults, you will use adult lancets which have a 2.4 mm blade. For children, you will use children's lancets which are orange in color and have a 2.25 mm blade.

f) Remove the white blade slot cover by first twisting it 360^{o} and then pulling it out. ***Do not pull out the needle slot cover without twisting it first*** as this may cause the needle not to pierce the skin.

Step 3 Prick the Finger

a) **Make sure that the finger is below the level of the respondent's heart** to increase the flow of blood to the finger. Using a rolling movement of your thumb, **lightly press the finger from the top knuckle toward the tip**. That action will stimulate a flow of blood to the sample area.

b) For children, it may be helpful if the parent/responsible adult assists you by holding the child's hand, as illustrated in Figure 4.3.

Figure 4.3 Parent assisting with child

c) When your thumb reaches the fingertip, **maintain a gentle pressure. Place the lancet perpendicular to the palmar surface of the end portion of the finger** slightly off center. Avoid the very tip of the finger or the sides beyond the palmar area, because of the risk of piercing the underlying bone (Figure 4.4).

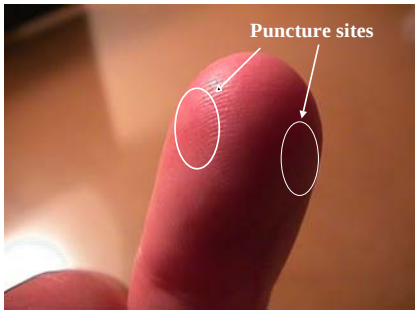


Figure 4.4 Puncture sites on the finger

d) Use the lancet to **puncture the skin** by placing the blade-slot surface against the area and pressing the trigger (Figure 4.5). The tip of the blade ejects through the blade slot, producing a micro-incision in the skin, and immediately retracts into the device. After puncturing the skin, turn the finger slightly to prevent blood from running into the grooves of the fingerprints.

Figure 4.5 Using lancet to prick finger

e) The used lancet should be immediately discarded into the biohazard waste bag while blood collection and haemoglobin measurement proceed. After the testing is completed, the lancet should be placed in the plastic bag provided for biohazardous waste, along with the other disposable materials used for the blood sample collection.

Step 4 Collect the blood drops

a) When the blood appears, use a sterile gauze pad to wipe away the first drop of blood (Figure 4.6). If the respondent is a child, wipe away the second drop and collect the third drop for Anaemia testing (see Chapter 5). If the respondent is an adult or youth and the required consent(s) for HIV testing have been obtained, the second, third, and fourth drops of blood will be collected on a labeled filter paper card for HIV testing and the fifth drop will be used for Anaemia testing (see Chapter 6). Otherwise, if the adult or youth respondent is only participating in the Anaemia testing, wipe away the second drop and collect the third drop for Anaemia testing in the same manner as for children (see Chapter 5).

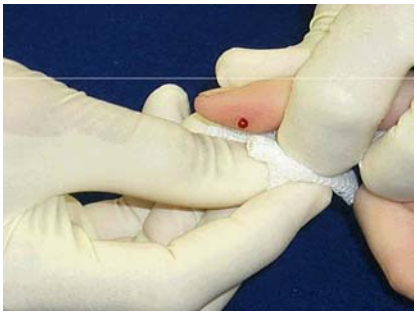


Figure 4.6 Wiping away first blood drop

b) If the blood stops flowing before a sufficient amount has been collected, the skin puncture procedure may be repeated with the respondent's (parent's/responsible adults) consent on a different finger. ***Do not reuse any of the supplies used for the first puncture.***

4.2 STEPS IN OBTAINING CAPILLARY BLOOD FROM THE HEEL FOR INFANTS

The ***heel*** is the puncture site for infants who are age 6 months to one year who are very thin. The following describes the steps that are involved in obtaining a capillary blood drop sample from the heel of an infant.

a) The puncture should be made outside a line drawn from the middle of the big toe to the heel or outside a line drawn from the area between the fourth and fifth toes to the heel (Figure 4.7). Take care to avoid the central area of the foot (to avoid injury to the nerves and tendons) or the center of the heel (to avoid piercing the heel bone).

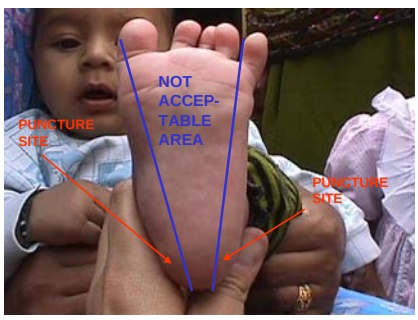


Figure 4.7 Site for heel puncture

b) Hold the heel firmly (Figure 4.8). Apply moderate pressure near the puncture site. This can be done by wrapping the heel using your thumb and second finger.

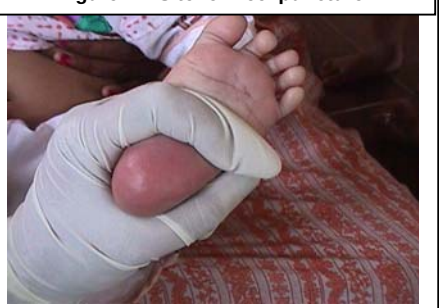


Figure 4.8 Holding the infant's heel

c) Clean the site with an alcohol swab. Make sure the site is dry before puncturing the skin with the lancet. In selecting a puncture site, avoid any areas of the skin that are broken or infected.

d) Use the lancet for the skin puncture by placing the blade-slot surface against the area and pressing the trigger. Ensure the free flow of blood.

e) Wipe away the first two drops of blood using a sterile gauze pad and collect the third drop for Anaemia testing (see Chapter 5).

5 ANAEMIA TESTING FOR CHILDREN

This chapter addresses the specific procedures that should be followed in performing the Anaemia testing of eligible children. The tasks involved in that process include:

- Collecting the third blood drop from a finger or heel prick in a microcuvette;
- Testing the blood sample with the Hemocue photometer and recording the haemoglobin level for the child on the Anaemia Testing Page;
- Informing the parent/responsible adult of the child's haemoglobin level and providing an informational brochure on Anaemia;
- Providing a written referral for follow-up medical attention for children found to be severely anemic;
- Recording the final outcome of the Anaemia testing process for the child.

In general, you should try to complete the Anaemia testing for all of the eligible children present in the household at the time of your visit for whom consent has been obtained before proceeding to conduct Anaemia and HIV testing with eligible women and men in the household.

5.1 COLLECTING BLOOD AND TESTING FOR ANAEMIA

The main steps involved in testing a child for Anaemia include:

- Pricking the child's finger (heel);
- Collecting the capillary blood in the microcuvette;
- Obtaining and recording the haemoglobin level;
- Disposing of biohazardous wastes.

The procedures for pricking the child's finger (heel) were detailed in Chapter 4. The following section describes the steps that should be followed in collecting a blood drop in the microcuvette for Anaemia testing.

Step 1 Collect the Capillary Blood in the Microcuvette

a) After pricking the finger following the procedure described in Chapter 4, use a sterile gauze pad to wipe away the first two blood drops from the finger (heel) prick.

b) Apply the HemoCue microcuvette to the middle of the blood drop. The microcuvette will fill itself automatically by capillary action. The tip of the microcuvette needs to be filled completely (Figure 5.1). Never "top off" the microcuvette after the first filling. In the unusual event that the microcuvette is not completely filled, use a fresh microcuvette and attempt to fill it with the next blood drop that forms.

c) Wipe any surplus blood off both sides of the microcuvette "like butter from a knife," using the clean end of a sterile gauze pad. Ensure that no blood is sucked out of the microcuvette when wiping it.

Finger prick

Heel prick

Figure 5.1 Filling the microcuvette

d) After filling, the microcuvette needs to be visually inspected for air bubbles. Since air bubbles may influence the haemoglobin measurement, any microcuvette containing air bubbles must be discarded. In such cases, with the permission of the parent/ responsible adult, repeat the blood drop collection using a different finger (heel). Again, you must use new disposable supplies and follow all of the steps described previously in obtaining the new sample.

Step 2 Obtaining the Haemoglobin Level

Place the microcuvette in its holder and gently push the holder into the photometer (Figure 5.2).

Figure 5.2 Placing microcuvette in photometer

Reading the results:

The microcuvette should be analyzed immediately. The blood haemoglobin level in grams per deciliter (g/dl) is displayed after a delay of 15 to 45 seconds (Figure 5.3).

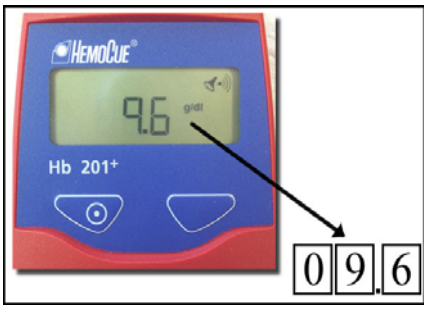


Figure 5.3 Haemoglobin level displayed on the HemoCue photometer

Step 3 Stop bleeding at puncture site

a) After the blood drop collection, wipe any remaining blood from the puncture site with a sterile gauze pad.

b) After making sure that the blood flow has completely stopped, take an adhesive bandage from its wrapper and apply it to the puncture site (Figure 5.4). Advise the mother especially when the child is a toddler to watch carefully that the child does not take off the bandage and put it in his/her mouth where he may choke on it.

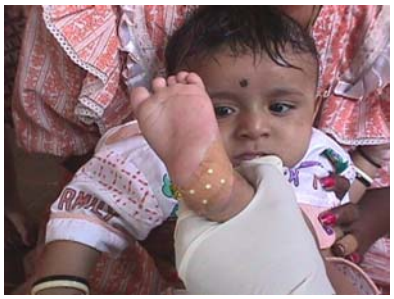


Figure 5.4 Applying adhesive bandage

Step 4 Record the Haemoglobin Level and Test Result

a) Record the haemoglobin level shown on the photometer (Figure 5.3) in the appropriate boxes in Column (80) of the Anaemia Testing Section (see Chapter 3). If more than one child in the household is eligible and is listed, check carefully that you are recording the haemoglobin level in the correct row of the schedule.

b) For each eligible child listed on the testing schedule, circle the appropriate Anaemia Test Result in Column (82).

Step 5 Collect biohazardous wastes

Place all biohazardous wastes (e.g., lancets, HemoCue microcuvettes, alcohol swabs, gauzes, and gloves) into a plastic bag provided for field disposal of these items. At the end of the day, follow the procedures described in Chapter 8 for the proper disposal of these waste materials.

5.2 PROVIDING ANAEMIA TEST RESULTS AND REFERRALS FOR SEVERE ANAEMIA

You will verbally report the results of the Anaemia test to the parent/responsible adult of each child tested and will provide an informational brochure about Anaemia, its causes, and the dietary or other measures that can be taken to prevent Anaemia.

In the case of a severely anemic child (i.e., child with a haemoglobin level **below 7 g/dl**), for whom the situation is critical, you will:

- Fill out an Anaemia Referral Slip (see Figure 3.8) with the child's name, age, measured haemoglobin level, and date tested.
- When you meet the team supervisor, provide him/her with the names of the children with haemoglobin levels less than 7 g/dl whose parents/responsible adults agree to referral, so that their names can be added to the Anaemia referral letter for that PSU.

The procedures for informing the parent/responsible adult are described in more detail in Chapter 3, Section 3.4.

Procedures for the proper recording of the outcome of the Anaemia testing process are described in Chapter 3, Section 3.3.

6 HIV AND ANAEMIA TESTING FOR ADULTS AND YOUTHS

This chapter of the manual focuses on the various steps involved in collecting the blood spot samples for HIV laboratory testing and performing Anaemia testing. You should complete the testing process with each respondent, including informing him/her of their measured haemoglobin level, before proceeding to the next eligible individual.

6.1 COLLECTING BLOOD FOR HIV AND ANAEMIA TESTING

The principal tasks involved in HIV and Anaemia testing for adults and youths include:

- Obtain voluntary consent of the respondent;
- Place the bar code labels on the HIV Testing Page of the questionnaire, a filter paper card, and the Blood Sample Transmittal Sheet;
- Prick the respondent's finger;
- Collect the second, third, fourth, and fifth blood drops from a finger prick on a labeled filter paper card;
- Collect the sixth drop in a microcuvette;
- Test the blood sample with the Hemocue photometer;
- Collect seventh drop again on the filter paper (if blood is still flowing)
- Stop the bleeding at the prick site;
- Record the haemoglobin level on the Anaemia Testing page of the household questionnaire;
- Place the filter paper card from the respondent in the drying box;
- Inform the respondent of his/her haemoglobin level and provide an informational brochure on Anaemia;
- Provide a written referral for follow-up medical attention for respondents found to be severely anemic;
- Provide all respondents with an informational brochure on HIV/AIDS, vouchers for free VCT services, and a list of participating VCT centres;
- Record results of the Anaemia and HIV tests in the Household Questionnaire;
- Collect biohazardous waste.
- Provide the names of the respondents with haemoglobin levels less than 7 g/dl who agree to referral to the supervisor;

Procedures for pricking the respondent's finger were detailed in Chapter 4. The following describes the steps that should be followed when collecting blood samples for both HIV and Anaemia testing.

Step 1 Placement of the bar code labels

a) Wearing a pair of latex gloves, carefully remove a new filter paper card from the plastic ziplock bag in which you have stored the cards. Make sure to handle the card in such a way that you do not touch the areas within the preprinted circle. ***Never handle a card with your bare hands as you may transfer sweat, dirt or other contaminants on to the card.***

b) Put the card-with the preprinted circles face-up on the clean plastic sheet that you have spread out on a flat surface. Discard the card if it drops on the floor or ground or if it becomes dirty in any other manner.

c) Take the **first bar code label** from the next full row on the sheet of labels and paste it in the row containing the line number of ***this*** respondent in Column (84) of the HIV Testing Page.

d) Take the **second bar code label** from the ***same row*** on the sheet of labels and paste it at the bottom half of the filter paper card. Do not cover up any part of the preprinted circles. ***Remember not to touch the circles*.**

e) Take the **third bar code label** from the ***same row*** on the sheet of labels. Paste it on the Blood Sample Transmittal Sheet for this cluster that will be sent together with the samples to the Ranbaxy lab in Mumbai.

f) **DO THIS CAREFULLY**. The bar code label is the only means of identifying the blood sample and for eventually linking the final HIV antibody test results to the interview data. Mistakes will result in mismatches later on. **CHECK THAT ALL THREE LABELS FOR A RESPONDENT HAVE BEEN PLACED ON THE FILTER PAPER CARD, THE TEST PAGE, AND THE TRANSMITTAL FORM BEFORE YOU PROCEED TO COLLECT BLOOD DROPS FROM THE RESPONDENT.** If you have more than one eligible respondent from whom all necessary consents for HIV testing have been obtained, first finish all steps for one respondent before repeating all steps for the next respondent.

Step 2 Collecting Blood Spots on the Filter Paper Card

a) Follow the instructions in Chapter 4 for pricking the finger and wiping away the first blood drop. Be sure to hold the respondent's hand at a level lower than his/her heart to promote blood flow.

b) While maintaining a firm grip on the finger, press gently on the side of the finger from which you are taking the blood sample to get a large second drop. Be careful to **avoid 'milking' or 'squeezing' the finger** as this could affect the test results. Wait until the drop is large enough to fill one of the preprinted circles on the card (Figure 6.1).

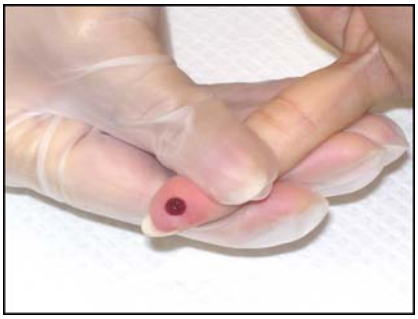


Figure 6.1 Large drop of blood

c) Move the card underneath the finger and let the blood drop freely fall in the center of the preprinted circle. In case the blood drop does not fall readily, you may touch the filter paper gently against the LARGE blood drop (but not the skin). In one step, a sufficient quantity of blood should be allowed to soak through and completely fill the circle (Figure 6.2).

The card must not be pressed against the puncture site on the finger. Make sure that the respondent's finger does not touch the card at any point when you are collecting the blood spots. DO NOT 'layer' the sample in an attempt to fill in the circle. Always use the pre-printed side of the card to collect the blood spots.

Figure 6.2 Filling up the pre-printed circle on the filter paper card

d) To enhance blood flow, gently apply intermittent pressure to the area surrounding the puncture site to get a third drop. Allow sufficient time for a large blood drop to form before filling a second circle on the filter paper card. Again, avoid milking or squeezing the finger.

e) There may be times when a drop of blood will not completely fill the circle. If a circle is not completely saturated, the next drop or just a portion of the next drop of blood may be used to saturate the circle if the drop is obtained immediately. If the first drop starts to dry due to any interruption in getting the subsequent drop, you must begin filling another circle. Layering or application of successive drops of blood to a dried or partially dried blood spot causes caking.

Note: In an attempt to fill the circle completely do not overfill or over saturate the circles. The following illustration shows unacceptable DBS samples (Figure 6.3 a).

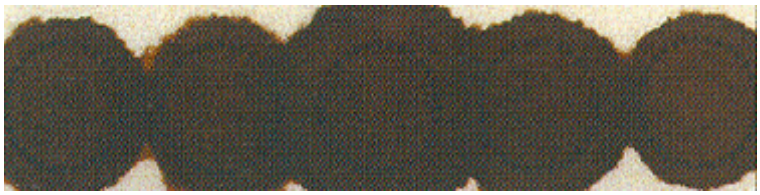
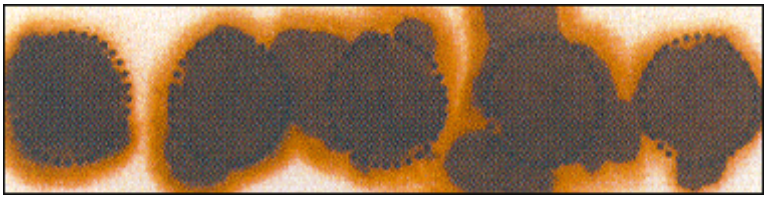


Figure 6.3 a Supersaturated (above) and serum rings (below) DBS samples are unacceptable



The blood should remain in the pre-printed area as shown in Figure 6.3 b.

f) Try to have the first drop fall exactly in the center of the pre-printed circle. However, if by accident the drop falls outside of the circle and is not large enough then let the next drop of blood fall again exactly in the center of the original drop and not in the pre-printed circle. Note: all circles should have uniform blood volume.

g) You must continue to collect drops of blood until you have fully saturated the **four** circles on the filter paper card (Figure 6.3 b). If the blood flow stops or decreases before you fully saturate the **four** circles, you will need to do another finger prick. Whenever this is necessary, you should explain to the respondent that you were unable to obtain an adequate sample and ask permission to obtain blood from another finger. Use fresh supplies and a **different finger** for the second finger prick.

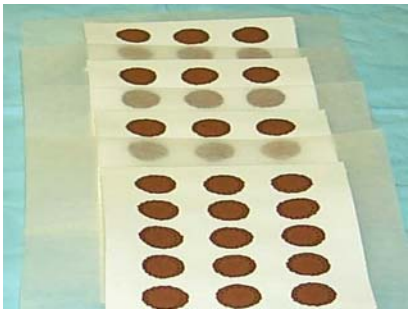


Figure 6.3 b Fully-filled circles without layering or caking

h) Place the card with the blood spots on the absorbent plastic sheet away from other items. Be careful not to drop the card.

Step 3 Collecting a Blood Drop in a Microcuvette for Anaemia Testing

a) After collecting the **four** blood spots on the filter paper card, apply the HemoCue microcuvette to the middle of the next (generally the fourth) blood drop.

b) As described in Chapter 5, the tip of the microcuvette needs to be filled completely (Figure 6.4). After it is filled, wipe any surplus blood off both sides of the microcuvette "like butter from a knife," using the clean end of a sterile gauze (Figure 6.4). Be careful so that the gauze does not soak up blood from inside the microcuvette.

Figure 6.4 Filling and wiping the outside of the microcuvette

c) Visually inspect the microcuvette for air bubbles. If there are bubbles present, discard the microcuvette. The testing must be repeated using a different finger. Explain to the respondent that you were unable to obtain an adequate sample and ask permission to obtain blood from <u>another</u> finger. Use fresh supplies and a **different finger** for the additional finger prick.

Step 4 Obtaining the Haemoglobin Level

Place the microcuvette in its holder and gently push the holder into the photometer (Figure 6.5).

Figure 6.5 Placing microcuvette in photometer

<u>Reading the result:</u>

The microcuvette should be analyzed immediately. The blood haemoglobin level in grams per deciliter (g/dl) is displayed after a delay of 15 to 45 seconds (Figure 6.6).

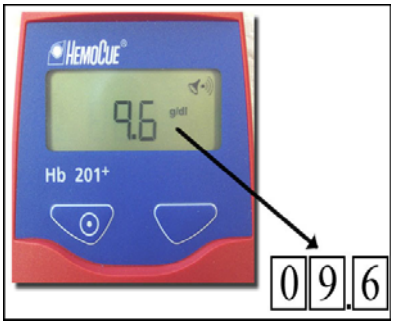


Figure 6.6 Haemoglobin level displayed on the HemoCue photometer

Step 5 Stopping bleeding at puncture site

a) After the blood drop collection, wipe any remaining blood from the puncture site with a sterile gauze pad. Press the gauze pad against the puncture site until the blood flow has completely stopped.

b) Take an adhesive bandage from its wrapper and apply it to the puncture site.

Step 6 Recording the Haemoglobin Level and Test Results

a) Record the haemoglobin level shown on the photometer (Figure 6.6) in the appropriate boxes in Column (80) of the Anaemia Testing Section (see Chapter 3). If more than one adult and/or youth in the household is eligible and is listed, check carefully that you are recording the haemoglobin level in the correct row of the schedule.

b) For adult women, verify that a code has been circled in Column (72B) for her pregnancy status.

c) For each adult or youth listed on the Anaemia Testing Section, record the appropriate Anaemia Test Result in Column (82).

d) For each adult or youth listed on the HIV Testing Section, record the appropriate HIV Result in Column (83).

Step 7 Placing the filter paper card in the drying box

a) The drying box should always be placed vertically on a flat surface before opening. Open the drying box. Carefully pick up the filter paper card with the blood spots and place it in a horizontal position in one of the slots in the drying rack in the box. ***Avoid touching or smearing the blood spots on other cards in the box when you are storing a new card. Never put more than one filter paper card in a single slot in the drying rack.*** [As described in Chapter 2, blood spots must dry overnight, preferably in a cool and dry place]. ***Never set any materials on top of the open box as they might contaminate the filter paper cards that are stored there.***

b) If the collection process in a household is interrupted for any reason, you should close the box to prevent any possible contamination.

c) After all blood spot samples for the household have been collected, carefully close the box and return it to a vertical position. The drying box should be kept in a vertical position at all times so that the filter paper cards remain in a horizontal position in their slots inside the box.

Step 8 Collecting biohazardous wastes

Place all biohazardous waste (e.g., lancets, HemoCue microcuvettes, alcohol swabs, gauzes, and gloves) into a plastic bag provided for field disposal of these items. At the end of the day, follow the procedures described in Chapter 8 for the proper disposal of these waste materials.

6.2 PROVIDING ANAEMIA TEST RESULTS AND REFERRALS AND HIV VCT MATERIALS

The interviewer will verbally report the results of the Anaemia test to each adult tested and the parent/responsible adult of each youth tested and will provide an informational brochure about Anaemia, its causes, and the dietary or other measures that can be taken to prevent Anaemia.

For each respondent with a haemoglobin level less than 7g/dl, fill out an Anaemia Referral Slip (see Figure 3.7) with the respondent's name, age, measured haemoglobin level, and date tested. When you meet the team supervisor, provide him/her with the names of the respondents with haemoglobin levels less than 7 g/dl who agree to referral, so that their names can be added to the Anaemia referral letter for that PSU.

All eligible respondents, regardless of their participation or non-participation in the HIV testing, should be provided with voucher(s) for free HIV VCT services, a list of participating VCT centres, and an informational brochure about HIV/AIDS.

These procedures are described in more detail in Chapter 3.

Procedures for the proper recording of the outcome of the Anaemia testing process are described in Chapter 3, Section 3.3.

6.3 STORING AND TRANSFERRING THE DRIED BLOOD SPOTS

The dried blood spot (DBS) samples must be carefully maintained until they are picked up and taken to the laboratory. They should never be exposed to sunlight during storage, and it is important to regularly monitor the levels of humidity in the stored samples. The following describes the steps that should be followed in storing and transferring the DBS samples.

Step 1 Storing the DBS Samples

Each morning, before you go to the field, you must remove the filter paper cards with the blood spots that you collected on the previous day from the drying box and prepare them for storage. The following describes the procedures in this step.

a) Put on a pair of latex gloves and carefully open the drying box. Check that the blood spots on each filter paper are completely dried (chocolate brown).

b) Separately remove each filter paper card on which the spots have dried from the drying box. Be careful not to touch the blood spots.

c) Gently fold a piece of glassine paper over the blood spots and put the filter paper card into a small (low gas-permeable) ziplock bag. Put one desiccant packet and a humidity indicator card behind the filter paper card, facing out so that the humidity level is visible. It is important that the desiccant packet and the humidity indicator card do not touch the blood spots. Close the zipper, gently pushing out any excess air in the bag as you are zipping it, being careful not to press on the blood spots. **DBS samples should not be allowed to come into contact with other DBS samples during handling, shipment or storage.**

d) Continue to package each of the filter paper cards from the previous day which have dried overnight, putting each one into a bag with a desiccant packet and a humidity indicator card. When you have packaged all of the filter paper cards, put them into the large ziplock bag that has been labeled for the cluster in which the samples were

collected. [Note that the Cluster Sample (ziplock) Bag itself should also contain a few loose dessicant packets and a humidity indicator card].

Figure 6.7: Packaged DBS Samples

e) Every couple of days, before adding newly packaged DBS samples to an existing Cluster Sample Bag, check the humidity indicator cards for the individually packaged DBS samples that you have previously placed in the Cluster bag. **The buildup of humidity can damage the quality of the sample.**

A bottom circle that is pink (30% humidity) indicates a warning of increasing humidity. If the middle circle (40%) or top circle (50%) is pink, gently open the small ziplock bag, remove the dessicant packet and replace it with a fresh dessicant packet. If any of the circles on the humidity indicator card have merged together so that they are not completely separated, remove the indicator card and replace it with a fresh indicator card. Close the zipper, gently pushing out any excess air in the bag as you are zipping it.

Before closing the zipper on the Cluster Sample Bag, check the condition of the dessicant packets and humidity indicator card that are kept loose inside the bag and replace as needed.

If you have additional Cluster Sample Bags for completed clusters that have not yet been collected by a Field Supervisor, examine all of the samples in those bags in the same manner, every couple of days, as long as they are with your team in the field.

Step 2 Transferring the DBS Samples

The purpose of the Blood Sample Transmittal Form is to account for the samples at each step of the way. Fold the Blood Sample Transmittal Form along the dotted lines (so that the bar-code labels are not folded), and keep it in the Sample Cluster Bag along with the DBS samples for that cluster.

When you have completed the cluster, remove the packaged DBS samples from the Cluster Sample Bag (do not open the small ziplock bags). One by one, check the bar codes on the labels on the filter paper cards against the bar codes affixed to the back side of the Blood Sample Transmittal Sheet. For each DBS sample, put a check mark in the column labeled TECHNICIAN for each corresponding bar code found on the transmittal sheet. Count the number of DBS samples and record in the boxes provided in Column (3) on the front side of the transmittal sheet in the row labeled TEAM LEADER. If there are any discrepancies, you must attempt to account for them. Use Column (7) to explain. Sign your name in Column (4) and the date in Column (6).

The team's field supervisor will follow behind you, re-verify the samples, and sign his name in the same row.

Periodically, a sample pick up person/vehicle will visit the teams to collect the DBS samples for the completed clusters. When he/she collects the DBS samples, he/she will recount the DBS samples for each of the completed clusters and sign the Blood Sample Transmittal Sheet. The samples and transmittal sheet will be transported to the Ranbaxy blood collection centres for logging before being transferred to the laboratory for processing.

7 PRECAUTIONS TO OBSERVE WHEN COLLECTING BLOOD SAMPLES

This chapter of the manual reviews some of the major precautions that you must observe in collecting samples, both to protect yourself and the subjects from which you are collecting samples from injury or infection and to prevent contamination of the samples.

7.1 GENERAL PRECAUTIONS WHEN COLLECTING BLOOD

This section describes the universal (general) precautions to be followed during blood collection for haemoglobin and HIV testing. The person responsible for collecting blood for haemoglobin and HIV testing must take precautions to prevent parenteral, skin, and mucous-membrane exposures to blood borne infections, such as hepatitis B, or human immunodeficiency virus (HIV). Under general precautions the following rules should be followed to ensure protection from acquiring blood borne infections.[1]

- **Wear gloves**. Gloves help to prevent skin and mucous-membrane exposure to blood. Gloves should be worn during blood collection for HIV and haemoglobin measurement until the specimen(s) from a subject is collected and all waste materials produced during the collection are disposed of. At that point, the gloves used with the subject should be treated as biohazardous waste. A new pair of gloves should be used with each subject. **Gloves must never be reused!**

- **Avoid penetrating injuries.** Although gloves can prevent blood contamination of intact and non-intact skin surfaces, they cannot prevent penetrating injuries caused by the instruments used for finger or heel pricks. Self-retractable lancet devices reduce the risk of penetrating injuries.

Lancets should not be used for purposes other than a single finger or heel prick to collect blood for the Anaemia/HIV 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 disposal biohazard bag.

If an accident occurs, any skin surfaces or mucous membranes that become contaminated with blood should be immediately and thoroughly washed.

- **Never eat or drink during the testing**. Since eating, drinking, and applying cosmetics may distract from the procedure, they are not permitted during HIV blood collection and haemoglobin measurement.

- **Properly dispose of all biohazardous materials.** All materials coming in contact with blood must be placed in a biohazardous waste container after use and disposed of according to the survey's policy on infectious waste disposal (see Section 8). Take precaution when storing and transporting the waste container during the fieldwork.

[1] For the universal precautions regarding bloodborne pathogens, see the U.S. Centers for Disease Control and Prevention guidelines and the U.S. Occupational Safety and Health Administration (OSHA) standards for protection from exposure to bloodborne pathogen.

7.2 RULES FOR COLLECTING SPECIMENS FOR HAEMOGLOBIN AND HIV TESTING[2]

There are a number of specific rules or precautions that you must observe when collecting the samples for Anaemia and HIV testing. These include:

- **Good position in relation to the respondent.** Position yourself well before you make a puncture on the respondent's finger.

- **Never "milk" the finger.** Excessive massaging or squeezing of the finger or foot will cause tissue juice to mix with and dilute the blood. This will result in erroneous test results, particularly yielding low levels of haemoglobin concentration in the blood. Instead, the tester should employ only mild pressure by using the thumb and the second and third fingers to make a "pad" at the puncture site. This will make the connective tissue underlying the skin more porous and allow the capillary blood to flow easily after the incision.

- **Never mix alcohol with the blood**. Alcohol, which is used to clean the puncture site, can mix with the blood and cause hemolysis of the sample leading to errors in the testing results. To avoid this problem, the finger or heel must be air dried completely before being punctured.

- **Avoid obstructing blood flow**. It is important to hold the finger properly to allow for the accumulation of blood in the puncture-site area. Holding the finger too tightly can obstruct the blood flow to the finger.

- **Shallow puncture**. A deep puncture should be made for better blood flow and to have a representative concentration of red blood cells.

With respect to **Anaemia testing**, the following are important rules to observe:

- **Never remove a microcuvette from the container with fingers wet with alcohol**. This can result in alcohol coming into contact with the reagents inside the microcuvette and destroying them. Using fingers wet with alcohol to handle other microcuvettes in the container can also affect them.

- **Never use the first two drops of blood for haemoglobin testing**. The fifth drop of blood should be used for haemoglobin testing if the respondent has agreed to HIV testing. This ensures the free flow of blood and allows for the collection of blood with a representative concentration of red blood cells. If the respondent does not agree to HIV testing, only to Anaemia testing, **wipe out the first two drops** and then collect one drop for Anaemia.

- **Avoid inadequate filling or re-filling of the microcuvette**. The compartment of the HemoCue microcuvette that contains dry reagents (yellow portion) has to be completely filled. The microcuvette should be filled with a drop of blood in one continuous motion. An inadequately filled microcuvette that contains air bubbles should be discarded.

- **Wiping off blood on the microcuvette**. Excess blood on the outside of the microcuvette should be cleaned. Blood on the outside of the microcuvette can lead to high haemoglobin reading.

[2] Adapted from National Committee for Clinical Laboratory Standards (NCCLS) 1997

- **Avoid placing the microcuvette out for too long.** Keeping the microcuvette out of the container for too long before the procedure can lead to errors. Microcuvettes should be the last item taken out of the container before starting the procedure.

- **Avoid inadequate placement of the microcuvette**. The microcuvette has to be carefully placed on HemoCue's microcuvette holder and pushed slowly inside the photometer into position for reading. Avoid "slamming" the microcuvette holder and spraying the blood into the HemoCue's optic system. This action can damage the photometer.

- **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, which can destroy the reagents.

With respect to **HIV testing**, there are a number of additional rules that should be carefully observed including:

- **Do not layer**. If a drop of blood on the filter paper card begins to dry, do not layer additional drop of blood on the target spot (pre-printed circle on the filter paper card). If blood flow diminishes to incompletely fill circles, request consent from the subject (parent/guardian) to **repeat** the sample collection again using another finger.

- **Never touch circles on the filter card**. Avoid touching the area within the preprinted circles on the filter paper card before collection. Never touch the blood spots after collection.

- **Protect the filter card from contamination**. Do not allow water or other contaminants to come into contact with the specimen card before or after use.

Do not replace the specimens in the transport container until thoroughly dry (chocolate brown). Insufficient drying adversely affects test results.

- **Taking the filter paper card out of the package**. Filter paper card should be one of the last items taken out of the package before starting the blood collection procedure.

8 BIOHAZARDOUS WASTE DISPOSAL

Any material coming in contact with blood or serum (lancets, HemoCue Hb 201+ microcuvettes, alcohol swabs, gauzes, and gloves) is considered to be biohazardous, i.e., hazardous to other humans. Safe disposal of such material is very important to prevent the transmission and spread of various blood borne diseases, such as Hepatitis B and HIV, among survey personnel and within the study community. Biohazardous waste has to be collected in a special container during the blood collection and testing, securely stored and transported, and safely disposed at the end of each day of fieldwork.

If possible, commercially available biohazardous waste disposal containers should be used for waste disposal. These types of containers are red and have a special logo warning about biohazardous content. They can be securely closed for safe storage and transportation during the fieldwork. Whenever possible, the biohazard bags should be taken to health facilities, which employ standard procedures for biohazardous waste disposal.

8.1 MATERIALS AND SUPPLIES

The following items are required in the field for disposal of biohazardous materials after haemoglobin testing:

Kerosene
Four percent sodium hypochlorite solution[3]
Matches
Spade or other tool for digging a small pit
Ziploc-type polyethylene bags
Forceps
Sharps container labeled “Biohazard”[4]
Scissors

[3] Four percent hypochlorite solution could be purchased as a commercially available product. It could also be prepared in the field by substituting a hypochlorite powder using water. The liquid solutions (sodium hypochlorite solution and kerosene) should be stored in leak proof and airtight containers.

[4] A wide-mouth plastic jar could be used as sharps container.

8.2 PROCEDURES FOR FIELD DISPOSAL OF BIOHAZARDOUS WASTES

At the end of each blood collection and haemoglobin measurement, all materials used during the testing (gloves, HemoCue Hb 201+ microcuvettes, lancets, alcohol swabs, and gauze pads have to be placed in sharps container (a wide-mouth plastic jar) and kept there until the end of the working day. The following are the steps that should be followed in disposing of biohazardous materials.

First, a health investigator needs to determine a place where the waste disposal will be destroyed. An open field area with loose soil is preferable, since the materials need to be burnt and buried. Because of risk of fire, drought areas, as well as proximity to flammable materials, should be avoided.

Step 1: At the end of each working day, bring the sharps container (plastic jar) with biohazardous materials to the area selected for the waste disposal. Add a half liter of 4 percent sodium hypochlorite solution into the sharps container (plastic jar) with the biohazardous materials (see figure 8.1). After adding, close the container (jar) so it is airtight. Keep the jar in an upright position for five minutes. After that, invert the plastic jar and keep in that position for an additional five minutes.

Figure 8.1: Adding sodium hypochlorite

This step is necessary to ensure that all of the materials in the sharps container (plastic jar) are disinfected by complete immersion in the 4 percent sodium hypochlorite solution.

Step 2: Transfer the contents of the plastic jar, including the sodium hypochlorite solution to a thick polyethylene bag (Figure 8.2).

Figure 8.2: Transferring contaminated materials

Step 3: A forceps can be used if any material adheres or sticks to the walls of the plastic jar to transfer it to the polyethylene bag (Figure 8.3).

Figure 8.3: Removing remaining materials

Step 4: Use scissors to make a hole at the bottom of the polyethylene bag (Figure 8.4).

Figure 8.4: Making a hole in the bag

Step 5: Drain off the hypochlorite solution from the polyethylene bag (Figure 8.5).

Figure 8.5: Draining off hypochlorite solution

Step 6: Dig a small hole with a spade, and put the polyethylene bag containing the biohazardous materials in the pit (Figure 8.6).

Figure 8.6: Digging a pit for bag

Step 7: Put waste paper on the polyethylene bag containing biohazardous materials (Figure 8.7).

Figure 8.7: Putting waste paper on top of bag

Step 8: Pour some kerosene on the bag (Figure 8.8).

Figure 8.8: Pouring kerosene on bag

Step 9: Burn the polyethylene bag containing the biohazardous materials in the pit (Figure 8.9).

Figure 8.9: Burning Contaminated Materials

Step 10: Wait until all of the contents are burned (Figure 8.10).

Figure 8.10: Ascertaining that contaminated materials are completely burned

Step 11: Cover the pit with soil (see Figure 8.11).

Figure 8.11: Covering the pit with soil

It is the health investigator's responsibility to ensure proper disposal of biohazardous waste. It is unacceptable that the materials used during the testing in one fieldwork cluster are carried by the team to the next cluster. Biohazardous materials must be destroyed within 48 hours.

APPENDIX A

ANTHROPOMETRY PROCEDURES

All children born in January 2001 or later as well as all women age 15-49 and men age 15 - 54 will be weighed and measured. In the household schedule all eligible women, men and children are listed in Column 9, 10 and 11, respectively, and listed in Column 69 of the Height, Weight and Biomarker Measurement section. The results of the measurements will be recorded in the Columns **(73)** through **(76)**. The measurement of height and weight (anthropometric measurement) will be completed by the health investigator after all the individual interviews in a household have been completed, but you may need to help. The interviewer will record information on the age and date of birth of children and the age of women and men before the measurements are made. Note that all children under age 6 will be included in Column **(69)**, but only the subset of those children who were born in 2001 or later will be weighed and measured.

PROCEDURES AND PRECAUTIONS BEFORE MEASURING

1. **Layout of the Procedures**
   Each step of the measurement procedures is directed at specific participants, who are named in bold letters at the beginning of each step: "**Measurer**" and "**Assistant**".

2. **Two Trained People Required**
   Two trained people are required to measure a child's height and length. The measurer holds the child and takes the measurements. The assistant helps hold the child and records the measurements on the questionnaire. If there is an untrained assistant such as the mother, then the trained measurer should also record the measurements on the questionnaire. One person alone can take the weight of a child and record the results if an assistant is not available.

3. **Measuring Board and Scale Placement**
   Be selective about where you place the measuring board and scale. It is best to measure outdoors during daylight hours. If it is cold, raining or if too many people congregate and interfere with the measurements, it may be more comfortable to weigh and measure indoors. Make sure there is adequate light.

4. **Age Assessment**
   Before you measure, determine the child's age. If the child is less than two years, measure length (that is, with the child is lying down). If the child is two years of age or older, measure height (that is, with the child is standing up). If accurate age is not possible to obtain, measure length if the child is less than 85 cm. Measure height if the child is equal to or greater than 85 cm.

5. **When to Weigh and Measure**
   Weigh and measure after you have conducted the individual interviews.

6. **Weigh and Measure One Child at a Time**
   If there is more than one eligible child in a household, complete the weighing and measuring of one child at a time. Then proceed with the next eligible child. DO NOT weigh and measure all the children together. If there is more than one eligible woman in a household, weigh and measure her and all her eligible children before proceeding with the next woman. Otherwise measurements may get recorded in the wrong columns of the questionnaire. Return measuring equipment to the storage bags immediately after you complete the measurements for each household.

7. **Control the Child**
   When you weigh and measure, you must control the child. The strength and mobility of even very young children should not be underestimated. Be firm yet gentle with children. Your own sense of calm and self confidence will be felt by the parent and the child.

   When a child has contact with any measuring equipment, i.e., on a measuring board you must hold and control the child so the child will not trip or fall. Never leave a child alone with a piece of equipment.

8. **Coping with stress**
   Since weighing and measuring requires touching and handling children, normal stress levels for this type of survey work are higher than for surveys where only verbal information is collected.

   Explain the weighing and measuring procedures to the mother or father, and to a limited extent, the child, to help minimize possible resistance, fears or discomfort they may feel. You must determine if the child or the parent is under so much stress that the weighing and measuring must stop. Remember, young children are often uncooperative; they tend to cry, scream, kick and sometimes bite. If a child is under severe stress and is crying excessively, try to calm the child or return the child to the parent before proceeding with the measuring.

   Do not weigh or measure a child if:
   1. The parent refuses.
   2. The child is too sick or distressed.
   3. The child is physically deformed which will interfere with or give an incorrect measurement. To be kind, you may want to measure such a child and make a note of the deformity on the questionnaire.

9. **Recording Measurements and Being Careful**
   Keep objects out of your hands and pens out of your mouth, hair or breast pocket when you weigh and measure so that neither the child nor you will get hurt due to carelessness. When you are not using a pen, place it in your equipment pack or on the questionnaire. Make sure you do not have long fingernails. Remove interfering rings and watches before you weigh and measure.

10. **Strive for Improvement**
    You can be an expert measurer if you strive for improvement and follow every step of every procedure the same way every time. The quality and speed of your measurements will improve with practice. You will be required to measure women, men, and children. Do not take these procedures for granted even though they may seem simple and repetitious. It is easy to make errors when you are not careful. Do not omit any steps. Concentrate on what you are doing.

A.1 CHILD STANDING HEIGHT MEASUREMENT PROCEDURE (ILLUSTRATION 1)

1. **Measurer or Assistant**: Place the measuring board on a hard, flat surface against a wall, table, tree or staircase. Make sure the measuring board is stable. Many walls and floors are not at perfect right angles; if necessary, place small rocks underneath the height board to stabilize it during the measurement.

2. **Measurer or Assistant**: Ask the parent to take off the child's shoes and to unbraid or push aside any hair that would interfere with the height measurement. Ask the parent to bring the child to the measuring board and to kneel in front of the child so that the child will look forward at the parent.

3. **Assistant**: Place the questionnaire and pen on the ground (Arrow 1) and kneel on the right side of the child (Arrow 2).

4. **Measurer**: Kneel on the left of the child (Arrow 3).

5. **Assistant**: Place the child's knees and feet in the correct position, with knees and feet either together or apart. There are three possible positions for the knees and feet:

    a) Knees together and feet together
    b) Knees together and feet apart
    c) Knees apart and feet together

    } Which ever touches first!

6. **Measurer**: Determine if the child's feet should be against or away from the back of the height board by observing the imaginary line drawn from the tip of the shoulder to the heel, which is called the "mid-axillary line" (Arrow 4). This line should be perpendicular (i.e., 90°) to the base of the height board where the child is standing (you may have to move the child's feet away from the back of the height board to put them in the proper position). Note that with most preschool-age children who are not heavy or obese, the heels will probably touch the back of the height board (Arrow 5).

7. **Assistant**: With your thumbs against the index finger of each hand, place your right hand on the child's shins (Arrow 6) and your left hand on the child's knees (Arrow 7). Do not wrap your hands around the knees or feet (ankles) or squeeze them together. Make sure the child's legs are straight.

8. **Measurer**: Ask the child to look straight ahead at the parent if she is kneeling in front of the child. Make sure the child's line of sight is parallel to the ground (Arrow 8). Place your left hand on the child's chin and gradually close your hand (Arrow 9). Note that with most preschool-age children who are not heavy or obese, the back of the head will touch the back of the height board (Arrow 10); however, if the child is heavy or obese, there will be a space between the back of the child's head and the back of the measuring board. Make sure the child's shoulders are level (Arrow 11), the hands are at the child's side (Arrow 12), and at least the child's buttocks touch the back of the measuring board. Note that with most preschool-age children who are not heavy or obese, the back of the head, the shoulder blades, the buttocks, the calves and heels will touch the back of the measuring board (Arrows 10, 13, 14, 15 & 5).

9. **Measurer and Assistant**: Check the position of the child (Arrows 1-15). Repeat any steps as necessary.
10. **Measurer**: When the child's position is correct, lower the headpiece on top of the child's head (Arrow 16) making sure to push through the child's hair. Read and call

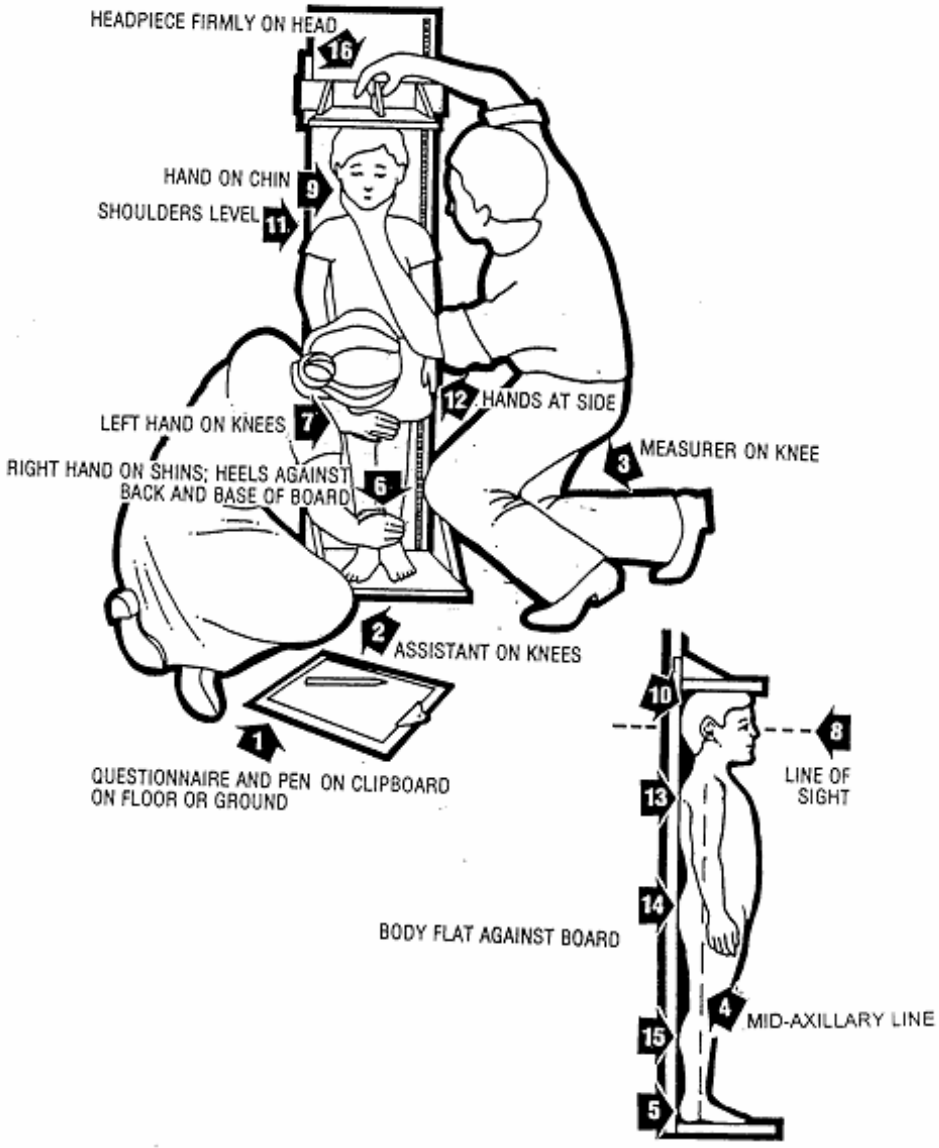
out the measurement to the nearest 0.1 cm. Remove the headpiece from the child's head, your left hand from the child's chin, and allow the child to return to the parent.

11. **Assistant**: Immediately record the measurement on the questionnaire and show it to the measurer.

12. **Measurer**: Check the recorded measurement on the questionnaire for accuracy and legibility. Instruct the assistant to correct any errors.

Illustration 1

Child Height Measurement



A.2 CHILD LENGTH MEASUREMENT PROCEDURE (ILLUSTRATION 2)

1. Measurer or Assistant: Place the measuring board on a hard, flat surface, such as the ground, floor or a solid table. Make sure the measuring board is stable.

2. Assistant: Place the questionnaire on the ground, floor or table (Arrow 1) and kneel behind the base of the measuring board if it is on the ground or floor (Arrow 2).

3. Measurer: Kneel at the right side of the child (at the child's feet) so that you can move the foot piece with your right hand (Arrow 3).

4. Measurer and Assistant: With the help of the parent, gently lower the child onto the measuring board, making sure the measurer supports the child at the trunk of the body while the assistant supports the child's head.

5. Assistant: Cup your hands over the child's ears (Arrow 4). With your arms straight (Arrow 5), place the child's head against the base of the board. The child should be looking straight up (Arrow 6) so that the line of sight is perpendicular to the board. Your head should be directly over the child's head. Watch the child's head to make sure it is in the correct position against the base of the board.

6. Measurer: Make sure the child is lying flat in the centre of the board (Arrow 7). Place the child's knees and feet in the correct position, with knees and feet either together or apart. There are three possible positions for the knees and feet:

a. Knees together and feet together
b. Knees together and feet apart
c. Knees apart and feet together

Whichever touches first!

With your thumb against your index finger, place your left hand on the child's knees (Arrow 8) and press them gently, but firmly against the board. Do not wrap your hand around the knees or squeeze them together. Make sure the child's legs are straight.

7. Measurer: Check the position of the child (Arrows 1-8). Repeat any steps as necessary.

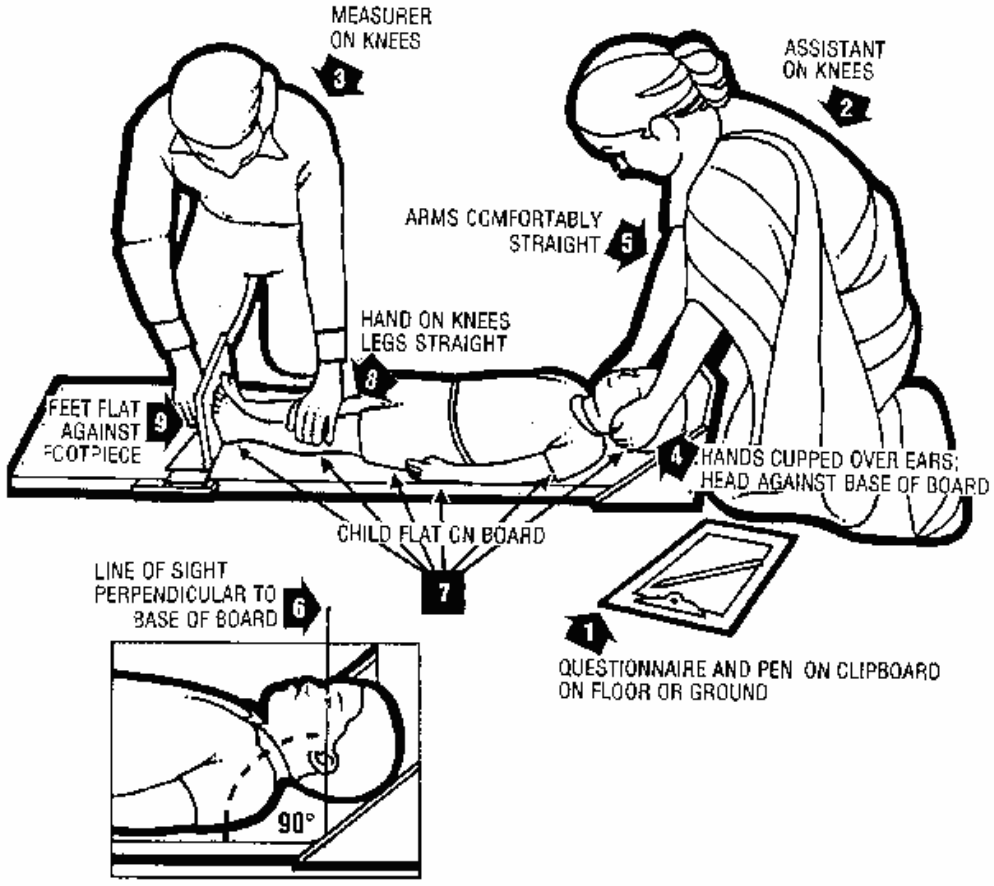
8. Measurer: When the child's position is correct, move the foot piece with your right hand until it is firmly against the child's heels (Arrow 9). Read the measurement to the nearest 0.1 cm and call out the measurement to the assistant. Return the child to the parent.

9. Assistant: Record the measurement on the questionnaire and show it to the assistant for confirmation.

10. Measurer: Check the recorded measurement on the questionnaire for accuracy and legibility. Instruct the assistant to correct any errors.

Illustration 2

Child Length Measurement



A.3 ADULT STANDING HEIGHT MEASUREMENT PROCEDURE (ILLUSTRATION 3)

(NOTE: The standing height of adults can be taken by one person alone, the Measurer).

1. Measurer: Place the measuring board on a hard, flat surface against a wall, table, tree or staircase. Make sure the measuring board is stable. Many walls and floors are not at perfect right angles; if necessary, place small rocks underneath the height board to stabilize it during the measurement.

2. Measurer: Ask the person to take off his/her shoes and ask him/her to unbraid or push aside any hair that would interfere with the height measurement. Ask the person to stand on the base of the height measuring board and to face forward.

3. Measurer: Place the questionnaire and pen on the ground (Arrow 1) and stand on the left side of the person (Arrow 2).

4. Measurer: Determine if the person's feet should be against or away from the back of the height board by observing the imaginary line drawn from the tip of the shoulder to the heel, which is called the "mid-axillary line" (Arrow 3). This line should be perpendicular (i.e., 90°) to the base of the height board where the person is standing. Note that with almost all adults you will have to move the person's feet away from the back of the height board to put them in the proper position; Arrow 4.

5. Measurer: Place the knees and feet in the correct position, with knees and feet either together or apart. There are three possible positions for the knees and feet:

a. Knees together and feet together
b. Knees together and feet apart
c. Knees apart and feet together

} *Whichever touches first!*

6. Measurer: Ask the person to look straight ahead. Place your left hands on the person's chin and gradually close your hand (Arrow 5). Position the person's head so that the line of sight is parallel to the ground (Arrow 6). Note that with most adults, the back of the head will not touch the back of the height board—there will be a space between the back of the person's head and the back of the measuring board (Arrow 7). After you have placed the person's head in the proper position, release your hand from the person's chin and ask him/her to hold his/her head in the position you have just placed it in.

Make sure the person's shoulders are level (Arrow 8), the hands are at the person's side (Arrow 9), and at least the buttocks touches the back of the measuring board). Note that with most all adults, only the buttocks and perhaps the shoulder blades will touch the back of the measuring board (Arrows 10 & 11).

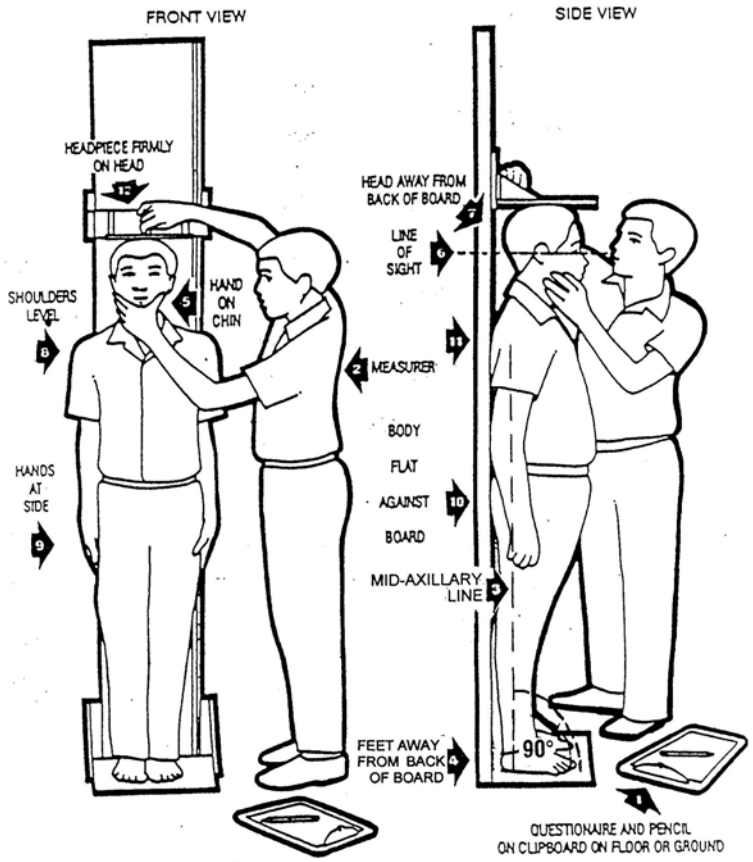
7. Measurer: Check the position of the person (Arrows 1-11). Repeat any steps as necessary.

8. Measurer: When the person's position is correct, lower the headpiece on top of the head (Arrow 12) making sure to push through the person's hair. Read and call out the measurement to the nearest 0.1 cm. Remove the headpiece from the person's head, and escort the person off the height board.

9. Measurer: Immediately record the measurement on the questionnaire.

10. Measurer: Check the recorded measurement on the questionnaire for accuracy and legibility. Correct any errors.

*Standing Height of Adults**



* From: "Anthropometry as Part of Household Surveys", I.J. Shorr, The World Bank, Washington, D.C., (in press)

A.4 TAKING WEIGHT WITH THE UNICEF ELECTRONIC SCALE (UNISCALE)[5]

1.0 Equipment for Weight

1.1 The Uniscale is a digital scale for weighing both children and adults. The scale has a 150 kg capacity and weighs in 0.1 kg increments. The scale is solar powered; therefore, there are no batteries to replace.

1.2 Bag with padding to hold the scale

2.0 Preparing the Adult and Children to Take Their Weight

2.1 Show the Uniscale to the adult and explain that you will weigh her/him and their children on the scale. Tell her/him that infants and any other children who will not stand on the scale alone can be held by the adult to obtain their weight.

2.2 Explain to the adult that she/he will be weighed first, followed by any children, beginning with the youngest child, then the second youngest child, etc.

2.3 Ask the adult to wear light clothing while being weighed and to remove any heavy clothing, sandals, shoes, etc.

2.4 Ask the adult to undress the child just before taking his/her weight.

3.0 Preparing the Uniscale

3.1 As soon as you arrive at a household, take the scale out of the storage bag and place the scale on a hard, level surface. Soft or uneven surfaces may cause the scale to malfunction. The scale needs time to adjust to the temperature where it will be placed for use (see 3.2 below).

3.2 The scale must adjust to changes in temperature. If you move the scale to a new site with a different temperature, wait for 15 minutes before using the scale.

3.3 The scale will not function correctly if it becomes too warm. It is best to use the scale in the shade or indoors. If the scale becomes hot and does not work correctly, place it in a cooler area and wait 15 minutes before using the scale again.

3.4 Handle the scale carefully:
Do not drop or bump the scale.
Do not weigh a total weight of more than 150 kg.
Do not store the scale in direct sunlight or other hot places.
Protect the scale against excess humidity or moisture.
Do not use the scale at temperatures below 0 degrees C or above 45 degrees C.
To clean the scale, wipe surfaces with a damp cloth and dry immediately. Never put the scale in water.
Do not store the scale in direct sunlight or other hot places.

4.0 Weighing Adults and Children Who Can Stand on the Scale by Themselves

4.1 Turn the scale on by covering the solar cells with your fingers for less than one second (the scale will not turn on if the solar cells are covered too long). The display should show the numbers “188.8 first and then after a few seconds

[5] The UNICEF Uniscale is manufactured by Seca Corporation, Munich, Germany. These instructions were adapted from instructions that accompany the Uniscale and revised by Irwin J. Shorr, MPH, MPS.

should show “0.0.” Wait for the scale to display the numbers “0.0” before asking the adult or child to step on the scale.

4.2 Ask the adult or child to step onto the centre of the scale and stand quietly. Immediately after the adult or child steps on the scale, the numbers “1 1” will appear in the display, followed by the weight of the mother or child. Wait until the numbers on the display no longer change and stay fixed in the display. Make sure that the solar cells are not covered by clothing near the adult’s or child’s feet.

4.3 The weight will appear in the display. Record the weight to 0.1 kg on the questionnaire.

4.4 Use the “Reading and Recording System.”

4.5 If you have just weighed an adult and if you are about to weigh an infant or child that must be held to take its weight, then ask the adult to remain on the scale since she will hold the child. If you will next weigh a child who can stand on his/her own, ask the mother to step off the scale and weigh the child by repeating the steps in this section (Section 4.0 above). If you will weigh an infant or child that must be held by an adult, then go to step 5.0.

5.0 Weighing Infants or Children Who Must be Held by an Adult While on the Scale
(NOTE: If it is cold and the adult wants the child to be covered during the weighing, give her/him a blanket or cloth for covering the child AFTER you have recorded her/him weight on the questionnaire. If you do not give the adult a blanket or cloth to cover the child, GO TO STEP 5.1. If you give the adult a blanket or cloth to cover the child, GO TO STEP 5.2.).

5.1 If You Do NOT Give the Adult a Blanket or Cloth to Cover the Child:

5.1.1 While the mother is still on the scale, cover the solar cells for one second. The scale will read “0.0.” There will be a small image of a mother holding a baby which means that the scale is ready to weigh the child in the adult’s arms.

5.1.2 Give the child to the adult. Wait until the numbers on the display no longer change. The number in the display is the weight of the child only, even though the adult is also standing on the scale.

5.1.3 Record the weight of the child to 0.1 kg on the questionnaire.

5.1.4 Follow the “Reading and Recording System.”

5.1.5 If there is another child to weigh in the adult’s arms, ask the adult to remain on the scale. Take the previous child from her/him and repeat steps 5.1.1 – 5.1.4. *It is very important that you cover the solar cells while the adult is on the scale before weighing each child (i.e., make sure to repeat step 5.1.1 above).*

5.2 If You Give the Adult a Blanket or Cloth to Cover the Child:

5.2.1 Ask the adult to step off the scale after you have recorded her/his weight.

5.2.2 Give her/him the blanket or cloth and ask her/him to step back on the scale.

5.2.3 After the numbers in the display stop moving, cover the solar cells for a second. The scale display will read "0.0". There will be a small image of a mother holding a baby, which means that the scale is ready to weigh the child in the adult's arms.

5.2.4 Give the child to the adult. Wait until the numbers on the display no longer change. The number in the display is the weight of the child only, even though the adult is also standing on the scale.

5.2.5 Record the weight of the child to 0.1 kg on the questionnaire.

5.2.6 Follow the "Reading and Recording System."

5.2.7 If there is another child to weigh in the adult's arms, ask the adult to remain on the scale. Take the previous child from her/him and repeat steps 5.2.1 – 5.2.7. *It is very important that you cover the solar cells while the adult is on the scale before weighing each child (i.e., make sure to repeat step 5.2.3 above).*

5.3 If You Weigh an Infant Who Weighs Less Than 2.0 kg:

If no weight is displayed in the panel when an adult holds a very small baby while on the scale, follow these steps:

5.3.1 Ask the adult if you can hold her baby for a moment.

5.3.2 Ask the adult to step on the scale.

5.3.3 Cover the solar cells with your fingers for one second. The display should read "0.0" and a small image of a mother holding a child should be displayed next to the "0.0".

5.3.4 Ask the adult to step off the scale.

5.3.5 Give the baby to the adult.

5.3.6 Ask the adult to step back on the scale.

5.3.7 The weight of the baby only should appear in the display panel. Make sure to wait for the numbers to stop moving before recording the weight on the questionnaire.

5.3.8 Record the weight of the baby on the questionnaire to 0.1 kg.

6.0 Additional Notes on the Uniscale:

6.1 The Uniscale switches off automatically two minutes after the last weighing.

6.2 If there is too much movement on the scale during measurement, the display will fluctuate between "1." and ".1" (i.e., these numbers will keep moving) until the load on the scale becomes stable.

6.3 Do not weigh loads with a total weight of more than 150 kg.

6.4 Possible reasons for the scale not taring [returning to zero ("0.0") after covering the solar cells when the adult stands on the scale]:

6.4.1 There was no weight on the scale to tare (i.e., the adult was not on the scale).

6.4.2 The solar cell was not covered completely.

6.4.3 The solar cell was covered for more than one second; try covering it for less than one second.

6.4.4 It was too dark; put the scale in a place with brighter light.

6.4.5 The load weighs more than 120 kg; use a lighter load.

6.5 What to do if the Scale Display Shows the Following Error Messages:

E01:

The scale has to readjust itself. Ask the adult to step off the scale and wait until EO1 no longer appears.

E02 and switches off automatically:

Be sure that there is nothing on the scale and try to start the scale again by covering the solar cells with your fingers for one second.

E03 and switches off automatically:

It is either too hot or too cold for the scale to function. Move the scale to a different place where the temperature is between 0 and 45 degrees C; then start the scale by covering the solar cells with your fingers for one second.

E04 after measuring:

The load is too heavy (more than 150 kg). Ask the adult to step off the scale. If the load cannot be reduced, the weight cannot be taken.

E05 for a few seconds after trying to start the tare function:

The load is too heavy for taring (i.e., more than 120 kg). Ask the adult to step off the scale. If the adult weighs more than 120 kg, then the tare function cannot be used.

NOTES