

# **NATIONAL FAMILY HEALTH SURVEY (NFHS-6)**

## **CLINICAL, ANTHROPOMETRIC AND BIOCHEMICAL (CAB) MANUAL**

**2023-2024**

**APRIL 2023**



(स्थापना / Established in 1956)  
बेहतर भविष्य के लिए क्षमता निर्माण  
Capacity Building for a Better Future

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## PREFACE

In combination with classroom instruction and practical experience, this manual will be used to teach you how to collect blood samples and conduct basic tests to measure biomarkers for the 2023-2024 National Family Health Survey (NFHS-6). Before each training session, you should carefully study this manual and the biomarker section of the Household Questionnaire. You are encouraged to ask questions during training and to discuss problems encountered to avoid making mistakes during fieldwork. The training is organized into 4 phases:

- During the first phase, we will review with you the chapters of this manual. You will learn how to identify eligible respondents for biomarker measurement, how to record information relating to the biomarker being measured in the Biomarker Questionnaire or on special field forms, how to handle the technical procedures involved in the measurement of height/length, weight, as well as blood sample collection, testing, and transportation, and other related instructions.
- In the second phase, you will practice the procedures you've been taught by role playing with other trainees. This practice will include height, weight and blood pressure measurement; and finger pricks for blood glucose testing, and for the preparation of dried blood spots (DBS) for HIV, Hepatitis-B and Hepatitis-C testing in central laboratories.
- In the third phase, you will visit a health facility for additional practice. After obtaining the consent from respondents or the person responsible, in the case of children, you will practice taking height and weight measurements among children and adults, collecting blood samples from eligible respondents, and practice measuring biomarkers.
- In the final phase, known as field practice, you will be assigned to a NFHS-6 trainee team. During field practice, you will collect blood samples from eligible children and adults and measure biomarkers exactly as you will during the main survey fieldwork. Households that you visit will be in clusters that are not part of the India NFHS-6 sample.

Throughout the training, you may be given homework assignments and tests. At the end of the training, your overall performance will be assessed and those who have performed the best will be selected to work in the survey. Your training does not end at the start of fieldwork. Rather, it is a continuous process. Your team supervisor and the NFHS-6 health and survey coordinators will play important roles in continuing your training and in ensuring the quality of data you collect throughout the survey. They will:

- Periodically observe your fieldwork activities to ensure that you are conducting yourself professionally, obtaining informed consent from respondents, and following the sample collection and biomarker measurement protocol correctly;
- Spot check that you 1) visited the correct households, and 2) collected blood samples and measured biomarkers only from eligible respondents;
- Collect blood specimens for transport to the laboratory and consolidate the field record forms;
- Regularly meet with you to discuss your performance and give out future work assignments.

Any field staff member who is not performing at the level necessary to produce high-quality data required to make NFHS-6 a success may be released from service.

## Table of Contents

<b>CHAPTER 1: OVERVIEW OF SURVEY .....</b>	<b>1</b>
INTRODUCTION.....	1
OVERVIEW OF BIOMARKER COLLECTION .....	3
ELIGIBILITY .....	3
INFORMED CONSENT .....	5
<b>CHAPTER 2: ANTHROPOMETRY .....</b>	<b>9</b>
MATERIALS AND EQUIPMENT FOR ANTHROPOMETRY .....	9
PROCEDURES AND PRECAUTIONS BEFORE MEASURING .....	9
STEPS FOR MEASURING WEIGHT AND HEIGHT/LENGTH: .....	11
TAKING WEIGHT.....	12
MEASURING A CHILD’S HEIGHT: STANDING UP.....	17
MEASURING A CHILD’S LENGTH: LYING DOWN .....	20
MEASURING AN ADULT’S HEIGHT .....	22
<b>CHAPTER 3: BLOOD PRESSURE MEASUREMENT .....</b>	<b>25</b>
TECHNIQUE OF BLOOD PRESSURE MEASUREMENT.....	25
PRELIMINARY STEPS IN TAKING BLOOD PRESSURE MEASUREMENTS FROM ADULTS .....	26
HOW TO SEAT THE RESPONDENT CORRECTLY WHEN TAKING A MEASUREMENT .....	28
DETERMINING THE CUFF SIZE .....	31
TAKING A BLOOD PRESSURE READING .....	31
WHAT DISPLAY SYMBOLS AND ERROR MESSAGES MEAN .....	33
<b>CHAPTER 4: GENERAL PROCEDURES FOR COLLECTING CAPILLARY BLOOD DROP SAMPLES FROM ADULTS AND CHILDREN .....</b>	<b>35</b>
MATERIALS AND SUPPLIES FOR PERFORMING FINGERPRICK.....	35
STEPS IN OBTAINING CAPILLARY BLOOD FROM THE FINGER OF ADULTS .....	36
STEPS IN OBTAINING CAPILLARY BLOOD FROM CHILDREN 48-71 MONTHS OLD .....	38
PRECAUTIONS TO OBSERVE WHEN COLLECTING BLOOD SAMPLES.....	40
GOOD BLOOD COLLECTION PRACTICES .....	40
<b>CHAPTER 5: BLOOD GLUCOSE TESTING .....</b>	<b>42</b>
INTRODUCTION.....	42
CAUSES OF DIABETES.....	42
BLOOD GLUCOSE TESTING IN NFHS-6 .....	42
GENERAL PROCEDURE IN CONDUCTING THE RANDOM BLOOD GLUCOSE TEST .....	43

**CHAPTER 6: DRIED BLOOD SPOT (DBS) COLLECTION FOR HIV, HEPATITIS-B AND HEPATITIS-C** ..... **52**

<b>MATERIALS AND SUPPLIES FOR DBS COLLECTION FOR HIV, HEPATITIS-B AND HEPATITIS-C TESTING .....</b>	<b>53</b>
<b>COMBINED PROCEDURE FOR GLUCOSE TESTING, TESTING, AND DBS COLLECTION FOR HIV, HEPATITIS-B AND HEPATITIS-C TESTING .....</b>	<b>56</b>

**CHAPTER 7: BIOHAZARDOUS WASTE DISPOSAL .....** **67**

<b>UNIVERSAL PRECAUTIONS IN THE COLLECTION OF BLOOD SAMPLES.....</b>	<b>67</b>
<b>STANDARD PRECAUTIONS AGAINST BLOOD BORNE PATHOGENS .....</b>	<b>71</b>
<b>APPENDIX 1: BIOMARKER TESTING CONSENT STATEMENTS .....</b>	<b>73</b>
<b>APPENDIX 2: NFHS-6 BLOOD PRESSURE REFERRAL FORM .....</b>	<b>75</b>
<b>APPENDIX 3: NFHS-6 RANDOM BLOOD GLUCOSE REFERRAL FORM .....</b>	<b>76</b>
<b>APPENDIX 4 (A,B,C): REFERRAL CARD FOR FREE HIV, HEPATITIS-B AND HEPATITIS-C TESTING ..</b>	<b>77</b>
<b>APPENDIX 5: NFHS-6 BLOOD PRESSURE AND DIABETES BROCHURE FOR ADULTS .....</b>	<b>80</b>
<b>APPENDIX 6: HEPATITIS-B AND HEPATITIS-C BROCHURE .....</b>	<b>81</b>
<b>APPENDIX 7: CALIBRATION LOG - MEASURING BOARDS .....</b>	<b>82</b>
<b>APPENDIX 8: CALIBRATION LOG - WEIGHING SCALES.....</b>	<b>83</b>
<b>APPENDIX 9: NFHS-6: DRIED BLOOD SPOT (DBS) TRANSMITTAL SHEET FOR ADULTS .....</b>	<b>84</b>



## **CHAPTER 1: OVERVIEW OF SURVEY**

### **INTRODUCTION**

The 2023-2024 National Family Health Survey (NFHS-6) is a nationally representative household survey that measures a wide range of indicators relating to fertility, family planning, and maternal and child health. This is the sixth NFHS conducted in India and will include for the first time DBS collected for Hepatitis-B and Hepatitis-C. NFHS-6 will produce population-based estimates of blood pressure, blood glucose, HIV, Hepatitis-B and Hepatitis-C prevalence and height and weight measurements among women age 15-49 and men age 15-54. Among young children age 0-71 months, length/ height and weight will be measured and children age 4-5 years will additionally be tested for Hepatitis-B.

#### **Blood Glucose Testing**

Finger stick blood will also be collected from women age 15+ and men age 15+ for glucose testing. NFHS-6 will use the SD CodeFree Glucometer to conduct blood glucose testing. The readings are considered equivalent to blood glucose levels in laboratory estimations using the Glucose Oxidase Method for glucose levels in the range of 10-600 mg/dL. The results will be available in five seconds on an LCD digital display and they will be given to respondents on a health card immediately after the test is completed. The health investigator will describe to the respondent the meaning of the results and will advise the respondent if a referral to a medical centre is necessary (see Appendix 3).

#### **Blood Pressure Measurements**

Elevated blood pressure (high blood pressure) is a known risk factor for a number of chronic and non-communicable diseases. NFHS-6 will measure the blood pressure of eligible respondents using an OMRON Blood Pressure Monitor to determine the prevalence of hypertension. Blood pressure measurements for each respondent, women age 15+ and men age 15+, will be taken on three separate occasions and the readings recorded in the Biomarker Questionnaire with an interval of 5 minutes between readings. The results will be given to respondents on a health card immediately after the test is completed. The health investigator will describe to the respondent the meaning of the results and will advise the respondent if a referral to a medical centre is necessary. Respondents whose systolic blood pressure (SBP) is >140 mm Hg or diastolic blood pressure (DBP) > 90 mm Hg are considered to have elevated blood pressure readings and will be encouraged to see a doctor as soon as possible for a full evaluation (see Appendix 2).

#### **HIV Testing**

HIV sero-prevalence in India is routinely estimated using sentinel surveillance among pregnant women attending selected health facilities. This methodology, however, has significant limitations because men are excluded and because pregnant women are not representative of all women due to biases in their distribution by age as well as fecundity. One of the objectives of NFHS-6 is to

provide updated estimates of HIV sero-prevalence among adults in India. Consequently, a subsample of women age 15-49 and all men age 15-54 in the selected households will be requested to provide a finger stick blood sample for subsequent testing in a laboratory. Five pre-printed circles on filter paper cards will be filled with blood obtained from a finger prick for subsequent HIV testing (and additional Hepatitis B and Hepatitis C testing) in a laboratory. As part of the informed consent process, individuals who are eligible for the blood sample collection will be advised of the purposes for which the blood will be used and will be assured of the anonymity of the HIV test results. They will be told that it will not be possible to provide them with the results of the test, but if they are interested in determining their HIV status, they will be given a voucher for free HIV testing at one of the Integrated Counselling and Testing Centres (ICTC) nearest to their locality. They will also be given a referral about HIV/AIDS and counselling and testing (see Appendix 4C). Parents or guardians of adolescents age 15-17 will be asked for permission to test the adolescent before assent of the adolescent is sought.

### **Hepatitis-B and Hepatitis-C testing**

Hepatitis B is a vaccine-preventable liver infection caused by the Hepatitis B Virus (HBV). Hepatitis B is spread when blood, semen, or other body fluids from a person infected with the virus enters the body of someone who is not infected. It may happen through sexual contact, sharing needles, syringes or other drug-injection equipment or from mother to baby by birth. **Hepatitis C** is a liver infection caused by the hepatitis C virus (HCV). Hepatitis C is spread through contact with blood from an infected person. Today, most people become infected with the hepatitis C virus by sharing needles or other equipment used to prepare and inject drugs.

NFHS-6, for the first time, will collect a DBS through a subsample of women age 15-49 and all men age 15-54 will request to provide a finger stick blood sample for consequent testing in a laboratory. Also, DBS will be collected from children age 4-5 years in the same subsample households for Hepatitis-B testing only. The individuals who are eligible for the blood sample collection will be advised of the purposes for which the blood will be used and will be assured of the anonymity of the Hepatitis-B and Hepatitis-C test results. Those interested in determining their Hepatitis-B and Hepatitis-C status will be given a referral form (Appendix 4A,4B) for free testing at the near-most health facilities. In the case of adolescents, age 15-17 and children age 4-5 consent from parents and guardians will be taken.

### **Survey Design**

The NHFS-6 design calls for anonymous, linked data analysis. DBS samples from adults and children will be collected for selected parameter related to HIV, Hepatitis B, and Hepatitis C. ICMR in coordination with IIPS will take the responsibility of storage, transport and testing of DBS for above mentioned parameters in pre-selected laboratories. Health investigators will give a referral card for free HIV Hepatitis-B and Hepatitis-C testing and counselling to everyone eligible for testing. The fieldwork will be carried out by a number of interviewing teams. Field teams will consist of one field supervisor, three female interviewers, one male interviewer, and two health investigators. Female interviewers will interview women only and male interviewers will interview men only. Either female or male interviewers may conduct the

household interview. Height and weight of male and female respondents and children under the age of six years will be done by the health investigators on each team with assistance from interviewers, as needed. However, blood pressure measurement, blood collection for blood glucose testing, and preparation of dried blood spots for HIV, Hepatitis-B and Hepatitis-C testing will be done only by the specially trained health investigators.

## OVERVIEW OF BIOMARKER COLLECTION

A biomarker may be thought of as a characteristic that can be independently measured and evaluated as an indicator of normal biologic processes, pathogenic processes, or pharmacologic response to a therapeutic intervention<sup>1</sup>. Biomarker measurements can serve as diagnostic tools to identify diseases in their early stages and can be used as surveillance tools to track changes in disease patterns or to evaluate intervention programmes. In population-based surveys, biomarkers help assess the prevalence or occurrence of diseases or health conditions and can also be used at a macro level to measure the long-term effect of policies and programmes. In NFHS-6, biomarkers are measured in order to report levels of specific diseases and conditions at the population level. Specific to NFHS-6, the following biomarkers will be measured: weight, length/height, blood pressure, random blood glucose, HIV, Hepatitis-B and Hepatitis-C. This training manual will discuss the proper collection techniques and the appropriate recording and result reporting of these biomarkers.

Biomarker measurement or testing should take place only after the completion of the household and individual questionnaires. However, prior to measurement or testing, certain tasks must be completed. This chapter reviews these tasks, which include:

- Determining eligibility
- Obtaining informed consent.

## ELIGIBILITY

Not all household members are eligible for biomarker measurements. Thus, the first step in the collection process is to identify members of the household who are eligible: women age 15-49 in all households, men age 15-54 in a subsample of households, and children under age 6 in all households who are usual household residents or are visitors who stayed in the house the night before the household interview took place. Women and men age 15+ will be eligible for testing of blood pressure and blood glucose in all PSUs. Based on age and residency, eligible respondents may qualify for one or more biomarker measurements or tests.

**It is the responsibility of the interviewer** to identify all of the household members who are eligible for biomarker measurements. **It is the responsibility of the health investigator** to ensure that they have the correct respondent(s) and child(ren) as listed in the biomarker questionnaire. Individuals eligible for biomarker measurements will be identified by a Biomarker Summary menu in the CAPI program.

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<sup>1</sup> Biomarker Definitions Working Group, National Institutes of Health, 2001

**The table below summarizes which household members are eligible for which measurements and tests**

<b>Type of PSU Module</b>	<b>Eligible</b>	<b>Investigations</b>
<b>District Module</b>	Children 0-23 months	Weight and Length
	Children 24-71 months	Weight and Height
	Women 15-49	Weight, Height, Blood Glucose, Blood Pressure
	Women above 49 Men 15+	Blood Glucose, Blood Pressure
<b>State Module</b>	Children 0-23 months	Weight and Length
	Children 24-47 months	Weight and Height
	Children 48-71 months	Weight, Height, DBS Collection for Hepatitis-B testing
	Women 15-49	Weight, Height, Blood Glucose, Blood Pressure and DBS collection for HIV, Hepatitis-B and Hepatitis-C testing
	Men 15-54	Weight, Height, Blood Glucose, Blood Pressure and DBS collection for HIV, Hepatitis-B and Hepatitis-C testing
	Women above 49 Men above 54	Blood Glucose, Blood Pressure

When the interviewers have completed the household and individual interviews, they will fill information for all adults and children in the household who are eligible for biomarker measurements from their CAPI device in the appropriate sections of the paper Biomarker Questionnaire.

In the Biomarker Questionnaire, the eligible adult's name, line number, age, and marital status must be accurately recorded. It is the responsibility of the interviewer to transfer all the above information from his/her CAPI device into the Biomarker Questionnaire. The health investigator should check with the interviewer to make sure that the information entered in the Biomarker Questionnaire is correct and accurately recorded prior to collecting any biomarker-related information from the respondent. For children under age 6, the day, month, and year of the child's birth should be copied from the mother's birth history if she was interviewed, or else the date of birth should be asked from the mother or from another knowledgeable adult.

**The following are important points to keep in mind when completing the Biomarker Questionnaire:**

- 1. For all eligible adults who consent to biomarker testing and, who are also eligible for the individual interview, the biomarker data should only be collected after their individual interview has been completed.**

2. **Measure biomarkers from one individual at a time.** All biomarker testing should be completed on one individual at a time before moving on to the next eligible, consenting person. For example, if there is more than one eligible respondent in a household who has consented to biomarker testing, complete all the biomarker measurements/tests on her/him *before* proceeding to the next respondent. Likewise, complete the testing of all biomarkers from one child before proceeding to the next child. Failure to do so may lead to results being recorded in the wrong columns of the Biomarker Questionnaire.
3. **Never alter any responses in the Biomarker Questionnaire without consulting the interviewer.** Even in cases where there are concerns about an individual's eligibility for testing, proceed with height and weight measurement and testing. Record in the comments section of the Biomarker 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.

## INFORMED CONSENT

One of the most important tasks that must be done before conducting any biomarker tests is for you to explain the purpose of the testing to eligible respondents, or in the case of children, to the parent or adult responsible for the child and to obtain their consent before collecting any blood samples. In order to ensure that these individuals can make an 'informed' decision about whether or not they want to be tested, the NFHS-6 Biomarker Questionnaire contains informed consent statements for each biomarker that must be read to the respondent (or to the parent or adult responsible for the child) before you do the biomarker testing (see Appendix 1). For height/length and weight measurements among children or adults, you need to explain the procedures and ask for a verbal permission from the respondent or responsible adult to take the anthropometric measurements.

**These consent statements include the following basic elements:**

- a description of the objectives of the test
- basic information on how the test will be conducted
- assurances about the confidentiality of the results
- 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 before you can begin any testing or measurement. The approach for obtaining consent differs slightly when the eligible individual is a child under age 6 or an adolescent age 15-17. If the respondent is a child or adolescent, you must first obtain the consent of one of the respondent's parents, or in the absence of a parent, the consent of an adult who is at least 18 years of age and is responsible for the care of the child. For adolescents, you must also seek their assent. If the parent/responsible adult or the adolescent does not consent to the test, the test must not be performed. There are two exceptions to this rule of obtaining consent from a parent or responsible adult to test adolescents who are 15-17

years old: 1) if the adolescent is currently married or has ever been married, or 2) if the adolescent lives alone or in a household in which there are no adults. In either instance, the adolescent is considered an emancipated minor, and is to be treated like an adult. Under these conditions, consent of the adolescent is sufficient.

Prior to performing the blood pressure measurement, the test for random blood glucose, or to collecting blood samples for DBS preparation, you must record the outcome of the consent request in the applicable sections of the Biomarker Questionnaire. The informed consent procedure that should be followed throughout the questionnaire is shown in the box below.

### **INFORMED CONSENT SIGNATURE PROCEDURES**

**If the respondent agrees to the test, you should ask the respondent if she/he would be willing to sign on the signature line. If the respondent agrees to the test and to sign on the signature line, code '1' and have the respondent sign on the blank line. If the respondent agrees to the test, but does not want to sign her/his name, circle '3' and sign your own name. If the respondent refuses the test, circle '2' and sign your own name on the signature line. In the case of children, follow the same procedure as above with the parent/responsible adult.**

**Key points to remember include:**

- 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 and blood pressure measurements with the respondent, you may informally discuss many of the items included in the informed consent statement. However, before beginning the testing procedures or taking blood pressure readings, you must still read the informed consent statements exactly as they are worded in the Biomarker Questionnaire. If you feel that the respondent may find the statements repetitive, tell him/her that you are required to read the statement to ensure that respondent is given all the appropriate information.
- 2. Read the informed consent statements clearly.** Practice reading the consent statements out loud so that you become comfortable delivering them in a clear, natural voice and manner. Avoid speaking rapidly or in a monotone. Look at the respondent as you read the statement.
- 3. For adults and adolescents, always request consent for the different tests separately.** Be sure the respondent knows that it is possible to consent to one test and not to another test. Since the outcome of the consent process may differ for the blood glucose test, the blood pressure measurement, and DBS preparation for HIV, Hepatitis-B and Hepatitis-C testing, it is important that you accurately record the results for individual tests at the appropriate places.
- 4. Never collect blood from an adolescent before obtaining the consent of the parent or the adult responsible for the adolescent,** as well as the adolescent, unless the adolescent

is married, was formerly married, lives alone, or lives in a household in which there are no adult members.

5. **Never attempt to force or coerce consent.** Some respondents may be suspicious or fearful of having their blood collected for testing. Others may have questions or want to discuss the procedures before giving consent. Take time to patiently respond to all questions.
6. Some respondents may be reluctant to allow testing without consulting someone not present at the time of your visit (e.g., a woman 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.

Once the individual interviews have been completed, eligible respondents have been identified, and consent has been obtained, biomarker measurement can take place.

### Summary of Steps in Identifying Eligible Respondents and Obtaining Consent

- Interviewer completes the household and individual questionnaires.
- Interviewer checks the list of individuals eligible for biomarkers to confirm individuals who are eligible for biomarker measurements:
  - **Adults:** All women age 15-49, men age 15-54 in a subsample of households, who are usual residents or who stayed in the household the night before the interview, are eligible for biomarker measurement.
  - **Blood Pressure:** All women and men age 15 and above in all PSUs.
  - **Blood Glucose:** All women and men age 15 and above in all PSUs.
  - Children under age 6 years who are usual residents or who stayed in the household the night before the interview are eligible for biomarker measurement.
  - Children 0-47 months are eligible for height/length, weight measurements
  - Children 48-71 months are eligible for height, weight measurements, and DBS collection for Hepatitis B in a subsample of households.
- For adults, age 18 and older: Obtain consent for biomarker measurement and testing as follows:
  - Read consent statements exactly as written;
  - Record the outcome of the consent request based on the instructions in the BOX in the INFORMED CONSENT SECTION of the Introduction;
  - If consent is granted, proceed with biomarker measurement.
- For never-married adolescents, age 15-17:
  - Obtain consent for biomarker measurement from parent or responsible adult
    - Record whether the parent/responsible adult consented or refused and do the following based on the instructions in the BOX in the INFORMED CONSENT SECTION of the Introduction;
  - If the parent/responsible adult consented, obtain assent for biomarker measurement from the adolescent
    - Read consent exactly as written;
    - Record the outcome of the consent request based on the instructions in the BOX in the INFORMED CONSENT SECTION of the Introduction;
    - If consent was granted, proceed with biomarker measurement and testing.

- For children 48-71 months (DBS Collection for Hepatitis-B testing):
  - Obtain consent for biomarker measurement and testing from parent or responsible adult
    - Read consent exactly as written;
    - Record the outcome of the consent request and based on the instructions in the BOX in the INFORMED CONSENT SECTION of the Introduction;
    - If consent was granted, proceed with biomarker testing.
- For height/length and weight measurement among adults, you must obtain verbal permission from the respondent.



## CHAPTER 2: ANTHROPOMETRY

Anthropometry refers to the measurement of humans. In NFHS-6, anthropometry refers solely to the measurement of a person's height (length), weight. This information can be used to assess the nutritional status of a population. For children, standard indices of physical growth related to nutritional status are height-for-age, weight-for-height, and weight-for-age. A child who is below minus two standard deviations (-2 SD) from the median of a reference population in terms of height-for-age is considered short for his/her age or stunted. Stunting reflects the cumulative effect of chronic malnutrition. A child who is below minus two standard deviations (-2 SD) from the median of a reference population in terms of weight-for-height is considered too thin for his/her height, or wasted. Wasting is a condition reflecting acute or recent nutritional deficit or a recent illness. Weight-for-age is a composite index of stunting and wasting and is a good indicator to monitor nutritional status over time.

Among adults, height and weight measurement are used to calculate a person's body mass index (BMI) and to assess a woman's risk of having difficulty in delivering due to her short stature (height < 145 cm). BMI is calculated by dividing the weight in kilograms by the height in meters squared (kg/m<sup>2</sup>). BMI values are used to determine the percentage of the adult population that is normal, thin, overweight and obese.

### MATERIALS AND EQUIPMENT FOR ANTHROPOMETRY

- **SECA 874 U digital scale<sup>2</sup>:** for weighing children and adults. The scale has a maximum capacity of 200 kg and weighs in 50-gram increments. The scale is powered by six type AA 1.5 V batteries and has an 'ON-OFF' switch located at the front side of the scale.
- **SECA 213 Stadiometer:** for measuring the height of adults.
- **SECA 417 Infantometer:** for measuring the length of children under 2 years or less than 87 cm.
- **Biomarker Questionnaire**

### 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 or length. The measurer holds the child and takes the measurements. The assistant helps hold the child and records the measurements on the questionnaire.

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<sup>2</sup> The Seca 874 digital floor scale is manufactured by Seca Corporation, Munich, Germany. These instructions were adapted from instructions that accompany the Uniscale and that were revised by Irwin J. Shorr, MPH, MPS.

3. **Daily Calibration:** The weighting scale must be calibrated with standard weight on daily basis before going to field. The allowable error is +/- 50 gm. only. The stadiometer and Infantometer must be calibrated on daily basis with a standard measuring rod of a fixed length with allowable error of +/- 0.5 cm. The Health Investigators are required to keep a log of daily calibration. Any machine with error more than allowed should not be used for field work and should be immediately informed to IIPS.
4. **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.
5. **Age Assessment:** Before you measure, determine the child's age. If the child is less than two years old, measure length (that is, with the child lying). If the child is two years of age or older, measure height (that is, with the child standing). If accurate age is not possible to obtain, measure length if the child is less than 87 cm. Measure height if the child is equal to or greater than 87 cm.
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, 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 an Infantometer, 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, father, or other responsible adult 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:**

- The parent/responsible adult refuses,
  - The child is too sick or distressed,
  - 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.

**STEPS FOR MEASURING WEIGHT AND HEIGHT/LENGTH:**

1. Before the health investigator (HI) starts any biomarker measurements, the interviewer should carefully check that all adults and children in the household who are eligible for weight and height/length measurement have been recorded on the paper Biomarker Questionnaire. Children born in 2018 or later who are usual residents of the household or who are visitors who spent the previous night in the household are eligible for anthropometry. This information should be entered in the appropriate columns of the Biomarker Questionnaire by the interviewer.

In **Question 203**, for children under age 6 years, the day, month, and year of the child's birth should be copied from the mother's birth history if she was interviewed; otherwise, the date of birth should be asked from the mother or from another knowledgeable adult.

2. In **Question 204** confirm that the child was born in JANUARY 2018 or later. If the child was born before JANUARY 2018, go to **Question 203** for the next child.
3. Perform the child weight and height/length measurements according to the instructions below.
4. Check that the **Name, Line Number, Age, and Marital Status** of all eligible women and men has been recorded in **Question 302/401**, respectively, of the Biomarker Questionnaire.
5. Perform the adult weight and height measurements according to the instructions below.

## TAKING WEIGHT

### Preparing the Adult and Children to Take Their Weight

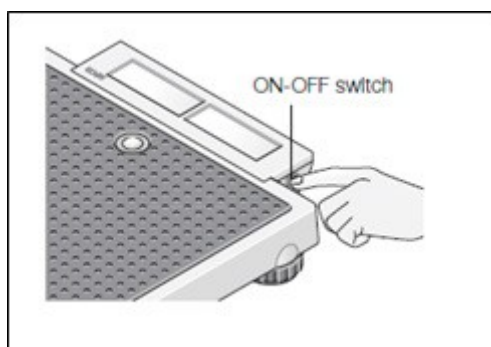
Show the scale to the adult and explain that you will weigh her/him and their young children on the scale. Tell her/him that infants and any other children who will not stand on the scale alone can be held by the adult to obtain the child's weight. Ask the adult to wear light clothing while being weighed and to remove shoes/sandals and any heavy clothing, etc. Ask the adult to undress the child just before taking his/her weight. Leave underpants on the child.

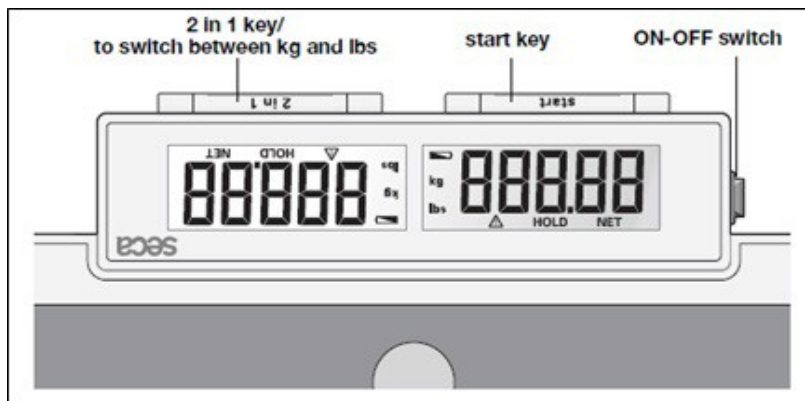


**SECA 874 model**

### Preparing the Scale

When you are about to weigh children or adults in the household, take the scale out of the storage bag and place the scale on a hard, level surface. Uneven surfaces or vibration may cause the scale to malfunction. You can adjust the individual feet on the base of the weighing scale to make it more stable. Turn on the power to the scale by pushing the switch located at the side of the display window of the scale to position 'ON'.





The scale will not function correctly if it is bumped, knocked or moved during the weighing. It is best to use the scale in the shade or indoors. Handle the scale carefully:

- Turn on the scale for weighing by pressing the ‘**START**’ key.
- Do not drop or bump the scale.
- Do not weigh a total weight of more than 200 kg.
- Do not store the scale in direct sunlight or other hot places.
- Protect the scale against excess humidity or moisture.
- To clean the scale, wipe surfaces with a damp cloth and dry immediately.
- Never put the scale in water.
- After using the scale, turn off the scale by pressing the ‘**START**’ key.
- The scale switches off on its own after a certain time:
  - After 3 minutes in Normal mode
  - After 2 minutes in the ‘**2 in 1**’ mode

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

1. If the power supply is not activated, push the power switch to position ‘ON’. The scale now has power. To prepare the scale for weighing, press the ‘**START**’ key when no one is on the scale. The display should show ‘SECA, 8.8.8.8.8 and ‘0.00.’ The scale automatically sets to zero and is now ready for use. Wait for the scale to display the numbers ‘0.00’ before asking the adult or child to step on the scale.
2. Before stepping onto the scale, ask to remove as much outer clothing as possible. Do not set up next to electrical appliances, for instance by a television.
3. Ask the adult or child to step onto the centre of the scale and stand still. Wait until the numbers on the display no longer change and stay fixed in the display.
4. ‘**HOLD**’ and a triangle [Δ] with an exclamation mark appear in the display window and the weight remains frozen until the next weighing operation. Record the weight in kg to two decimal places (for example, 61.35) on the Biomarker Questionnaire. Note that the second decimal place on the scale will show only ‘0’ or ‘5’. The scale will never show 1, 2, 3, 4, 6, 7, 8, or 9 for the second decimal place.
  - For children, record the child’s **weight** measurement in **Questions 205**. If the child’s weight was not measured, record the appropriate code in **Question 205**.

- Record an adult's **weight** measurement in **Questions 303/403**. If the adult's weight was not measured, record the appropriate code in **Questions 303/403**.

### **Weighing Infants or Children Who Must be Held by an Adult While on the Scale**

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

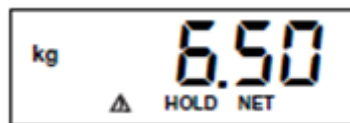
1. Ask the adult to step onto the center of the scale and stand still. Wait until the numbers are stable on the display window.

**PLEASE NOTE!!!** In the above statement, only a **“SHORT PRESS”** on the “2 in 1 function” is required in order to weigh children who need to be held. A **“LONG PRESS”** on the “2 in 1 function” will switch the units of measurements from **KILOGRAMS to POUNDS** instead.

2. Short press the **2 in 1** key. The scale stores the weight of the adult and the display returns to zero (**0.00**). **NET** will appear in the display.
3. Give the child to the adult. After the weight is stable for about 3 seconds, the weight will be retained. The display weight should not jump around, even due to a child's movement after this point.
4. **▲ HOLD** and **NET** appear in the display and the weight of the child being held can be recorded.

**Please note:** the scale will determine the weight of the child even though the adult is on the scale. Once the value for the child's weight becomes stable for about 3 seconds, the value is retained and **▲ HOLD** and **NET** appear in the display window. The number in the display is the weight of the child only, even though the adult is also standing on the scale.

5. Record the weight of the child as displayed on the scale (the scale measures with 50 g resolution) in the Biomarker Questionnaire. The second digit after the decimal will **ONLY** read “0” or “5”. Thus, a weight of 6.52 kg isn't possible, but a weight of 6.50 kg or 6.55 kg is possible on the scale.



**If there are other children to be weighed who must be held by the adult, finish all measurements for the first child before moving onto the next.**

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

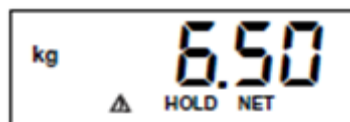
1. Ask the adult to step onto the center of the scale with the blanket and stand still. Wait until the numbers are stable on the display window.
2. Short press the **2 in 1** key. The scale stores the weight of the adult and the display returns to zero (**0.00**). **NET** will appear in the display.

**PLEASE NOTE!!!** In the above statement, only a **“SHORT PRESS”** on the “2 in 1 function” is required in order to weigh children who need to be held. A **“LONG PRESS”** on the “2 in 1 function” will switch the units of measurements from **KILOGRAMS to POUNDS** instead.

3. Give the child to the adult. After the weight is stable for about 3 seconds, the weight will be retained. The display weight should not jump around, even due to a child’s movement after this point.
4. **▲ HOLD** and **NET** appear in the display and the weight of the child being held can be recorded.

**Please note:** the scale will determine the weight of the child even though the adult is on the scale. Once the value for the child’s weight becomes stable for about 3 seconds, the value is retained and **▲ HOLD** and **NET** appear in the display window. The number in the display is the weight of the child only, even though the adult is also standing on the scale.

5. Record the weight of the child as displayed on the scale (the scale measures with 50 g resolution) in the Biomarker Questionnaire. The second digit after the decimal will ONLY read “0” or “5”. Thus, a weight of 6.52 kg isn’t possible, but a weight of 6.50 kg or 6.55 kg is possible on the scale.



**If there are other children to be weighed who must be held by the adult, finish all measurements for the first child before moving onto the next.**

**Additional Notes on the SECA scale:**

- The SECA scale switches off automatically 3 minutes after the last weighing in the ‘Normal Mode’ or two minutes if the ‘2 in 1’ function is activated.
- The ‘2 in 1’ key can be used to change the units of weight—from kilograms (Kg) to pounds (lb) or vice versa, if the key is held in for 3 seconds or longer. **DO NOT HOLD IN THE ‘2 IN 1’ KEY! PRESS THE KEY ONCE TO ACTIVATE THE FUNCTION FOR WEIGHING CHILDREN WHO MUST BE HELD BY AN ADULT.**
- **Check that you have not changed the units of weight from Kg to lb. NFHS-6 does not record weights in lb.**
- Do not weigh loads with a total weight of more than 200 kg.
- Possible reasons for the scale not taring (returning to zero (‘0.00’) after pressing the ‘2 in 1’ key when the adult stands on the scale):
  - There was no weight on the scale to tare (i.e., the adult was not on the scale).
  - The ‘2 in 1’ function was not activated.
  - The load weighs more than 200 kg; ‘STOP’ appears in the display. Use a lighter load.

## **What to do if the Scale Display Shows the Following Errors:**

No weight is displayed when there is a load on the scale.

- Check to see if the scale is switched on. Ask the adult to step off the scale and step gently on the weighing platform.
- Check to see if the power switch at the side of the scale is in the 'ON' position
- Press the 'START' key to prepare the scale for weighing
- Check the batteries

The scale keeps switching on, while being transported. The 'START' key has been activated. Turn off the scale by pushing the 'ON-OFF' switch to the 'OFF' position.

The scale displays a weight after being transported or after new batteries have been put in. Press the 'START' key; the scale will work normally again.

'0.00' does not appear before weighing. Start the scale again by pressing the 'START' key. There should not be any load on the scale.

'----' appears instead of '0.00' before weighing. Start the scale again after it switches off automatically; there should not be any load on the scale.

One segment of the display is illuminated constantly or not at all. There is a problem with that segment of the scale. Inform your service dealer.

The display shows a battery with split shading. The battery voltage is running low. The batteries should be changed in a few days.

'..batt' appears in the display. The batteries are empty. Replace the batteries.

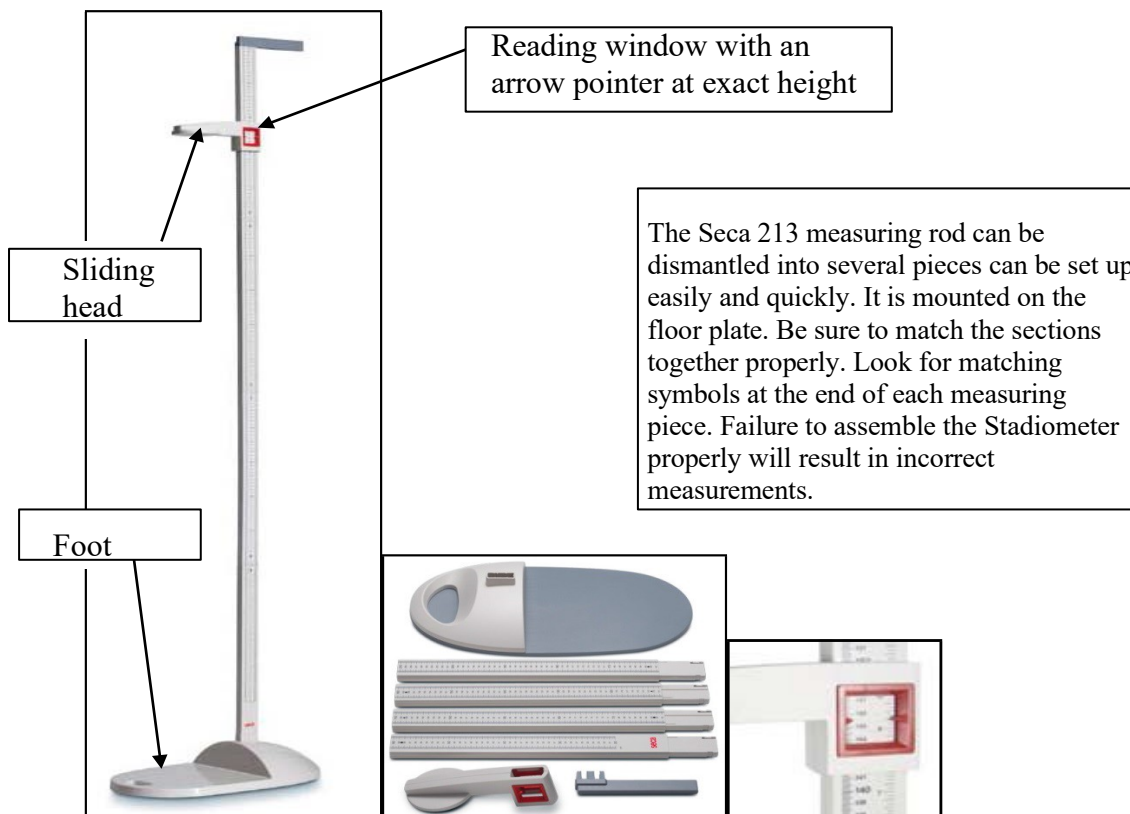
'STOP' appears in the display. The maximum load capacity of the scale has been exceeded.

The display flashes. Take the load off the scale and start again. Wait until 0.00 appears and weight gain.

The display *Err* and a number appear in the display window. Start the scale again after it switches off automatically. The scale will then work normally again. If this does not happen, turn off the power to the scale. If the scale still does not work properly, inform the regional coordinator or IIPS.



## MEASURING A CHILD'S HEIGHT: STANDING UP (ILLUSTRATION 1):

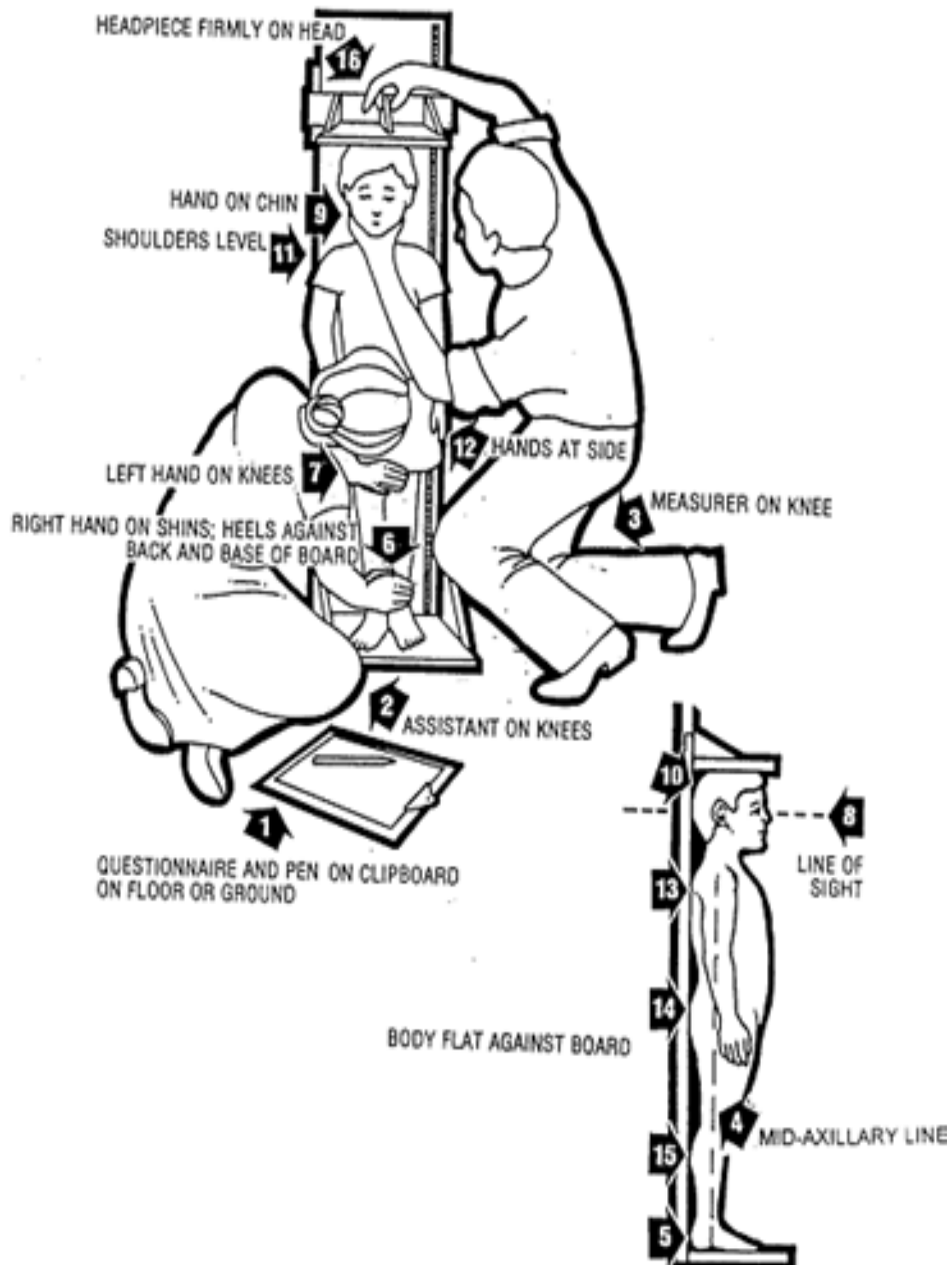


1. **Measurer or Assistant:** Place the Seca Stadiometer on a hard, flat surface against a wall, table, tree or staircase. Make sure the Stadiometer is stable. Many walls and floors are not at perfect right angles. If the Stadiometer is not completely stable, relocate it to a nearby location that provides the proper support.
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. If weather permits and the parent/guardian is comfortable, ask the parent to remove the child's clothing down to the undergarments. Ask the parent to bring the child to the Stadiometer and to kneel in front of the child so that the child will look forward at the parent.
3. **Assistant:** Place the Biomarker 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).

**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:

- Knees together and feet together
  - Knees together and feet apart
  - Knees apart and feet together
- } whichever touches first!

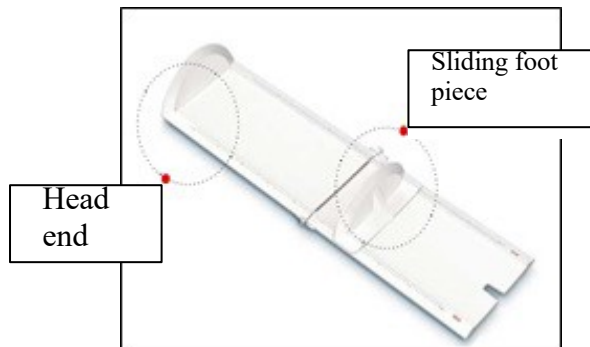
Illustration 1  
Child Height Measurement



5. **Measurer:** Determine if the child's feet should be against or away from the back of the Stadiometer 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 Stadiometer where the child is standing  
(You may have to move the child's feet away from the back of the Stadiometer 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).
6. **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.
7. **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 the thumb and index finger of your left hand, one finger on each side of 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 Stadiometer (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 Stadiometer. 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 Stadiometer. 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 Stadiometer (Arrows 10, 13, 14, 15 & 5).
8. **Measurer and Assistant:** Check the position of the child (Arrows 1-15). Repeat any steps as necessary.
9. **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.
10. **Assistant:** Immediately record the **height** measurements in Questions **206** on the questionnaire and show it to the measurer. Record that the child was measured standing up in **Question 206A**.
11. **Measurer:** Check the recorded measurement on the questionnaire for accuracy and legibility. Instruct the assistant to correct any errors.

## MEASURING A CHILD'S LENGTH: LYING DOWN (ILLUSTRATION 2):

For children less than 2 years old; or, when age cannot be obtained, length is measured for children less than 87 centimeters:



**SECA 417 Infantometer**

### **SECA 417 Infantometer**

**Measurement range:** 10–100 cm / 4-40"

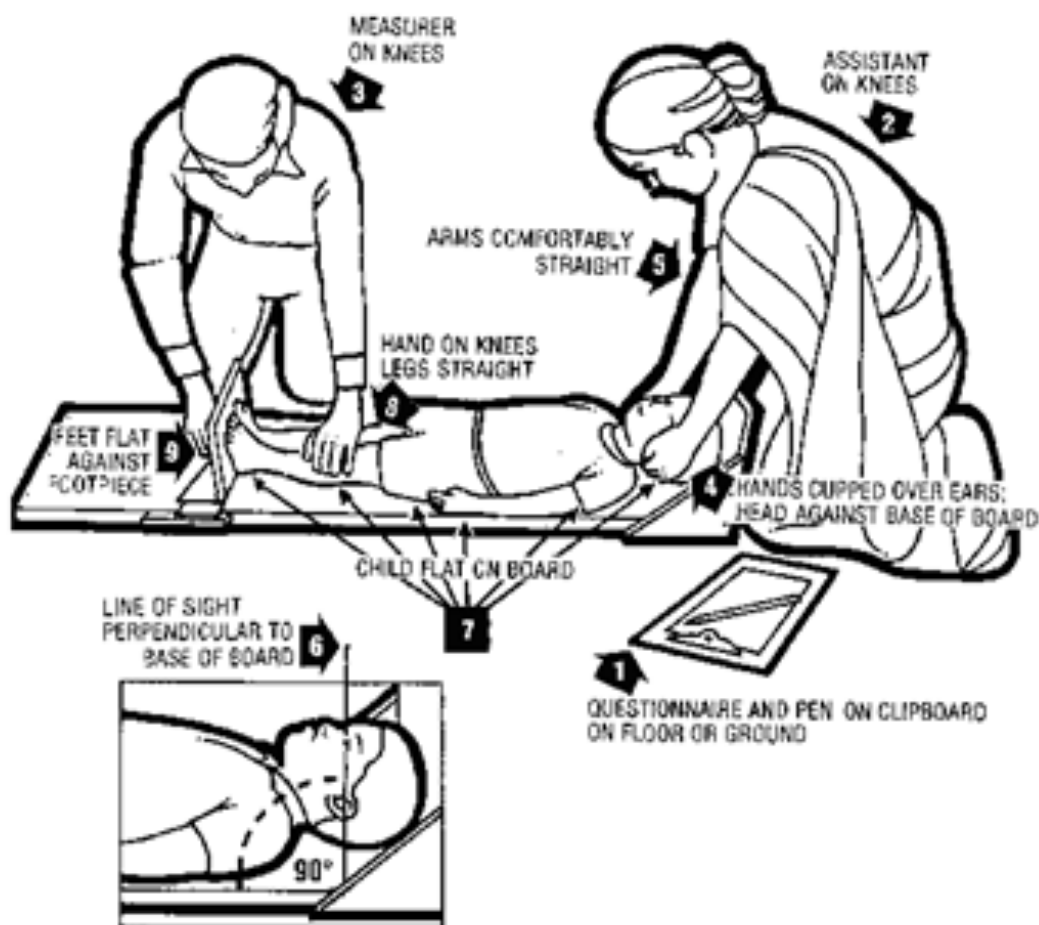
- Graduation: 2 mm / 1/8"
- Dimensions, measurement board (WxHxD): approx. 1.120 x 120 x 310 mm
- Dimensions, folded for transport (WxHxD): approx. 577 x 115 x 300 mm
- **Device weight:** approx. 1.4 kg

1. **Measurer or Assistant:** Place the Seca Infantometer on a hard, flat surface, such as the ground, floor. Make sure Infantometer is stable.
2. **Assistant:** Place the Biomarker Questionnaire on the ground, floor or table (Arrow 1) and kneel behind the fixed head end of the Infantometer 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 sliding foot piece with your right hand (Arrow 3).
4. **Measurer and Assistant:** With the help of the parent, gently lower the child on to the Infantometer, 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 fixed head end. 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 fixed head end of the Infantometer.

Illustration 2  
Child Length Measurement



6. **Measurer:** Make sure the child is lying flat in the centre of the Infantometer (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:

- Knees together and feet together
  - Knees together and feet apart
  - 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 sliding 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.

**Please note:** Pay special attention to the infant's feet. The infantometer has two measuring tapes on both ends. Be sure that the foot piece is not tilted due to the pressing of the infant's feet, lack of pressure on the knees, etc.

9. **Assistant:** Record the **height (length)** measurements in **Questions 206** and that the child was measured lying down in **Question 206A**. Show the recorded measurement to the measurer for confirmation.
10. **Measurer:** Check the recorded measurement on the questionnaire for accuracy and legibility. Instruct the assistant to correct any errors.

## MEASURING AN ADULT'S HEIGHT (ILLUSTRATION 3):

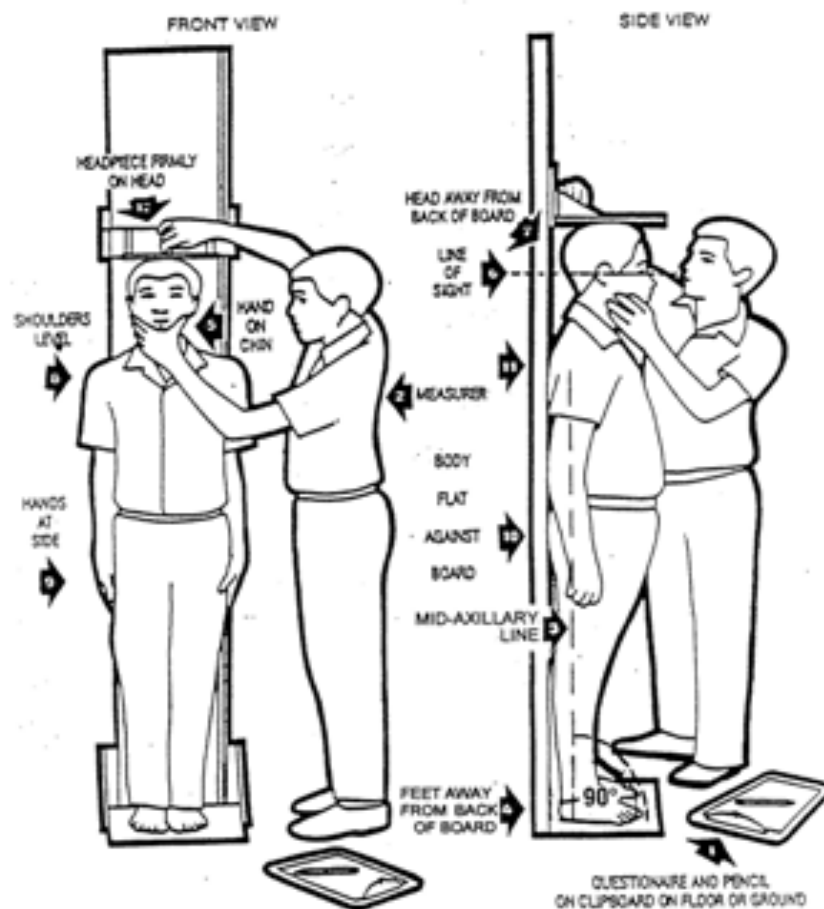
**NOTE:** The height of adults can be taken by one person alone, the Measurer.

1. **Measurer:** Place the Stadiometer on a hard, flat surface against a wall, table, tree, or staircase. An interviewer or health investigator can hold the board steady, if necessary. Make sure the Stadiometer is stable. Many walls and floors are not at perfect right angles. If the Stadiometer is not completely stable, try to move it to a more stable location. You can also adjust the individual feet on the base of the Stadiometer to make it more stable.
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 Stadiometer and to face forward.
3. **Measurer:** Place the Biomarker 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 Stadiometer 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:

- Knees together and feet together
  - Knees together and feet apart
  - Knees apart and feet together
- } whichever touches first!

**Illustration 3**

### *Standing Height of Adults\**



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

6. **Measurer:** Ask the person to look straight ahead. Cup the respondent's chin between the thumb and index finger of your left hand 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 Stadiometer—there will be a space between the back of the person's head and the back of the Stadiometer (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 Stadiometer. Note that with most adults, only the buttocks and perhaps the shoulder blades, will touch the back of the Stadiometer (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. Record an adult's **Height** measurements in **Questions 304/404**. If the adult's height was not measured, record the appropriate code in **Questions 304/404**.
10. **Measurer:** Check the recorded measurement on the questionnaire for accuracy and legibility. Correct any errors.

**Please note:** If an adult is taller than the measurer, the measurer must identify an object (chair, stool, etc.) he/she can safely stand on to ensure that the measuring tape is at his/her eye level. Alternately, if a respondent to be measured is shorter than the measurer, the measurer must stoop to ensure the measuring tape is at eye level when reading. Reading the tape above or below eye level will skew the measurement.

### **Summary of Steps in Measuring Anthropometry**

- Children less than 2 years old or, in the absence of age information, less than 87 cm
  - Obtain the exact day, month, and year of birth for a child from the mother's birth history if she was interviewed, or else the date of birth should be asked from the mother or from another knowledgeable adult.
  - Confirm that the child was born in January 2018 or later
  - Measure weight
  - Measure length with child lying down on an Infantometer
  - Record weight and height measurements in Q205 and Q206
  - Record that the child was measured lying down in Q206A
- Children 2 years or older or, in absence of age information, 87 cm or greater
  - Obtain the exact day, month, and year of birth for a child from the mother's birth history if she was interviewed, or else the date of birth should be asked from the mother or from another knowledgeable adult.
  - Confirm that the child was born in January 2018 or later
  - Measure weight
  - Measure height standing up
  - Record weight and height measurements in Q205 and Q206
  - Record that child was measured while standing in Q206A
- Adults
  - Verify the name with the respondent
  - Measure weight
  - Measure standing height
  - Record the weight, height, in Q303, 304, for women or Q403, 404, for men.
  - Record weight and height measurements in the appropriate sections



## CHAPTER 3: BLOOD PRESSURE MEASUREMENT

Elevated blood pressure (high blood pressure) is a known risk factor for death from stroke and coronary heart disease (CHD).

Arterial blood pressure is the force exerted by the blood on the wall of the artery as the heart pumps (contracts) and relaxes. Systolic Blood Pressure (SBP) is the degree of force when the heart is pumping (contracting) and Diastolic Blood Pressure (DBP) is the degree of force when the heart is relaxed. In this survey, you will measure systolic and diastolic blood pressure. Respondents who are found to have high blood pressure, identified as systolic pressure greater than 180 mmHg and/or diastolic pressure greater than 109 mmHg will receive an immediate referral to a local health facility and no further investigations should be done. All households where biomarkers were collected will be provided with an information brochure on blood pressure.

### TECHNIQUE OF BLOOD PRESSURE MEASUREMENT

In NFHS-6, blood pressure measurements will be taken to assess the population prevalence of high blood pressure; the focus is not on the clinical diagnosis of high blood pressure. **Therefore, these measurements in a survey situation do not constitute a medical diagnosis of disease, but will be used only as a statistical description of the survey population.** The OMRON BP monitor will be used in NFHS-6.



**OMRON BLOOD PRESSURE MONITOR**

The person having his/her blood pressure measured will be referred to as the ‘respondent’ and the person taking the measurements will be referred to as the ‘health investigator’. The Blood Pressure Measurement will be recorded in the blood pressure section of the Biomarker Questionnaire, household brochure and referral form if appropriate.

FIRST BP MEASURE			
SYSTOLIC .....	<input type="text"/>	<input type="text"/>	<input type="text"/>
DIASTOLIC .....	<input type="text"/>	<input type="text"/>	<input type="text"/>
REFUSED .....			994
TECHNICAL PROBLEMS ...			995
OTHER .....			996
(IF NOT MEASURED, GO TO 338) ←			

To measure the respondent's blood pressure, three blood pressure readings will be obtained. For simplicity, all blood pressure measurements will be made on the respondent's left arm. Where this is not feasible, the right arm will be utilized.

### PRELIMINARY STEPS IN TAKING BLOOD PRESSURE MEASUREMENTS FROM ADULTS

1. Before starting the blood pressure measurements, the respondent should have been sitting quietly for at least 5 minutes.
2. Be sure that the respondent does not smoke or drink coffee or tea during the measurements since smoking or drinking coffee or tea can affect the blood pressure. If the respondent consumed any alcohol, coffee, or tea, or smoked cigarettes before the examination, record this in **Qs. 312/412**.
3. If the respondent indicates any reason why the blood pressure procedure should not be done on the left arm, use the right. If there is a problem with both arms, do not take the blood pressure and note this in **Qs.316/416**. Observe the respondent's arm while talking to him/her. If you observe any rashes, small gauze/adhesive dressings, casts, withered arms, puffiness, tubes, open sores, hematomas (a localized swelling that is filled with blood caused by a break in the wall of a blood vessel) or wounds on both arms, do not take the blood pressure.

### Positioning the Respondent for Blood Pressure Measurement

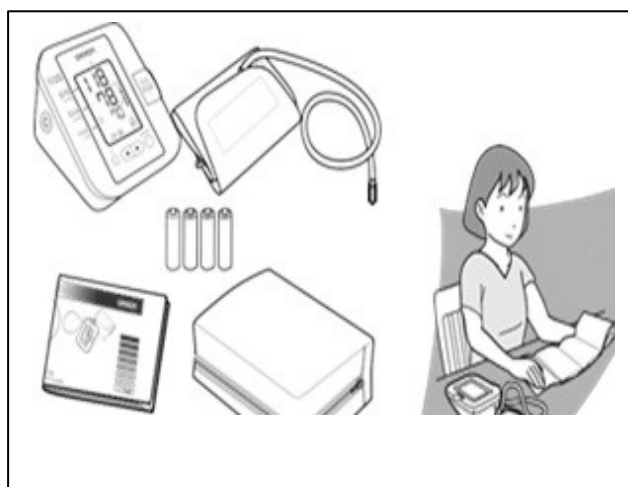
1. The respondent should be seated at a table in a relaxed, but not slouched, position with feet flat on the floor. The outer jacket or sweater should be removed and the sleeve should be rolled loosely up to the shoulder, ensuring that two fingers can be placed under the sleeve without difficulty. The respondent's left arm should be placed on the table, slightly flexed with palm upward.
2. The respondent's arm should be positioned so that it is resting on the table at heart level. Heart level is halfway between the shoulders and the waist. The respondent's elbow must be no lower than the lowest rib and must not be raised as high as the shoulder.
3. If the respondent is tall, it may be necessary to support the arm higher than a standard desk or table-top. Place the tall respondent's forearm on a pillow or a large book to raise the arm to heart level.

**For smaller or shorter adults, place a cushion or large book on the chair so that the arm is at heart level when the arm is resting on the desk or table-top. Place a box or large book under the respondent's feet if the feet do not rest flat on the floor.**

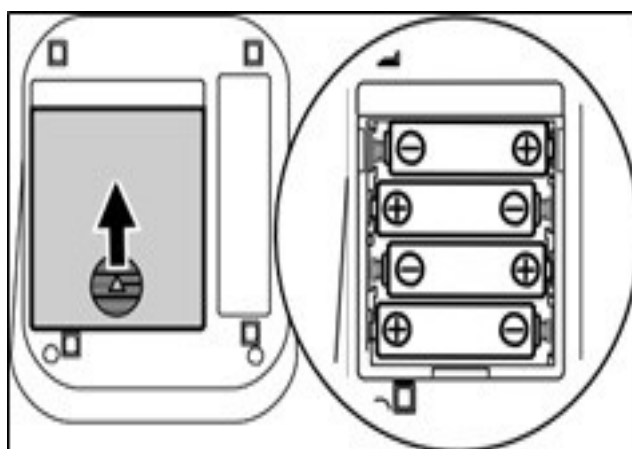
4. The health investigator should be seated facing and slightly to the left of the respondent, permitting easy access to the respondent's arm. The measuring equipment will be positioned so that the tube to the manometer is away from the respondent's body.

## **BEFORE YOU START**

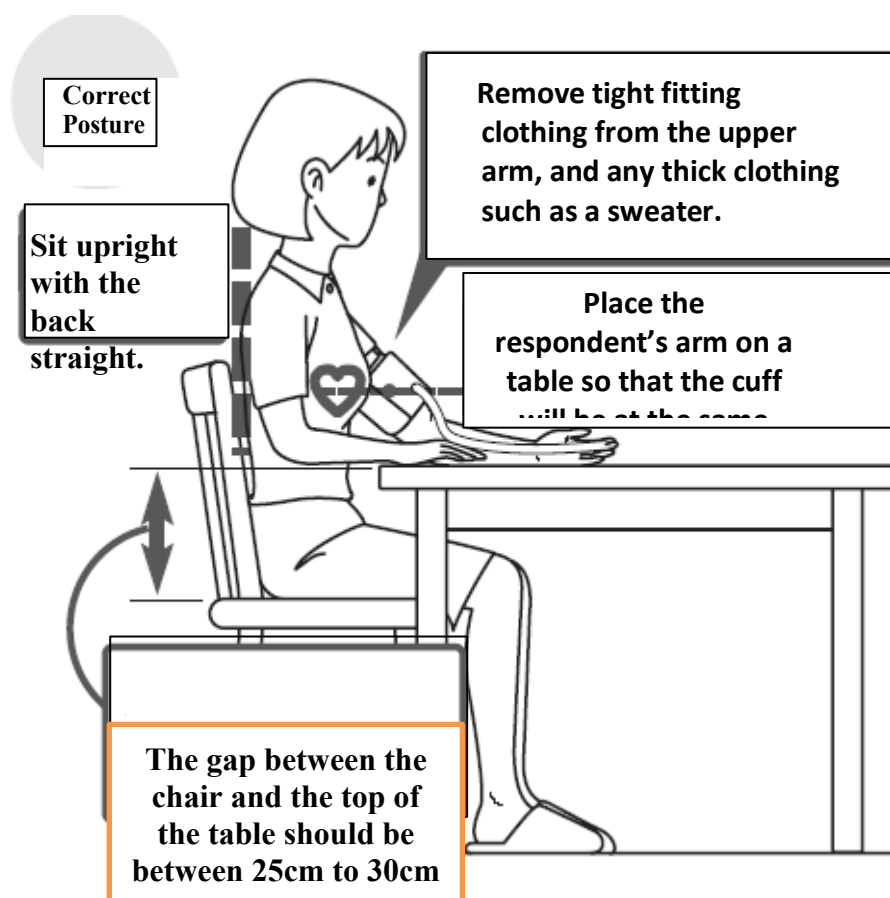
1. Make sure that all the components of the OMRON BP monitor are present.



2. Remove the battery cover and insert or replace 4 'AA' batteries as indicated in the battery compartment and replace the cover. If the battery is low, a symbol will appear on the display and it requires that the batteries be replaced immediately.



## HOW TO SEAT THE RESPONDENT CORRECTLY WHEN TAKING A MEASUREMENT



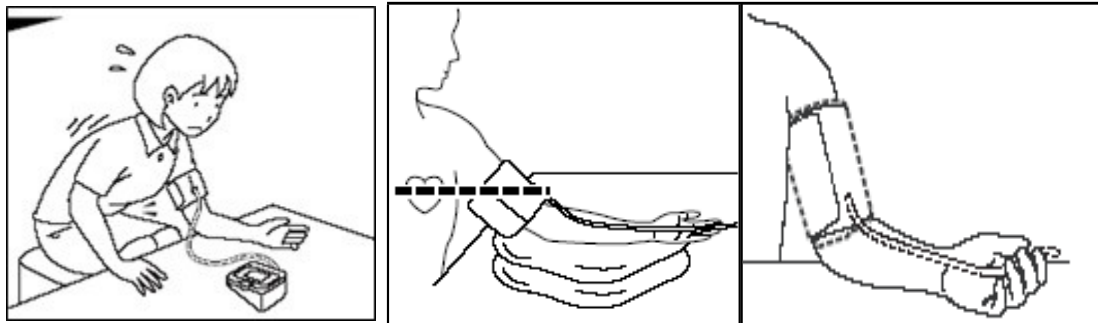
### Notes:

- Measurements should be taken in a quiet place. The respondent should be in a relaxed, seated position.
- Make sure that the room is not too hot or cold.
- The respondent should avoid eating, smoking, or **exercising for at least 30 minutes before having a measurement taken.**
- The respondent should not move or talk during the measurement procedure.
- Do not place the cuff over thick clothes and do not roll up the sleeve if it is too tight.

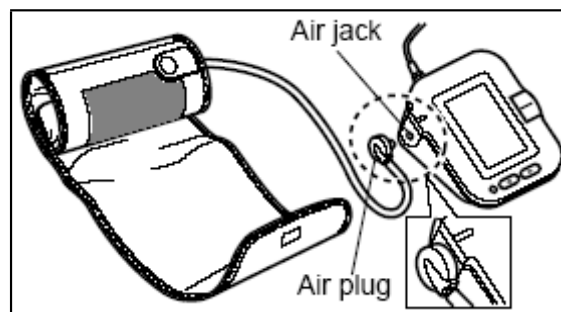
Correct posture during measurement is necessary to get accurate results. Examples of incorrect posture:

- Arched back (leaning forwards)
- Sitting cross-legged or crossed ankles
- Seating the respondent on a sofa or at a low table so that the respondents tend to lean forward.

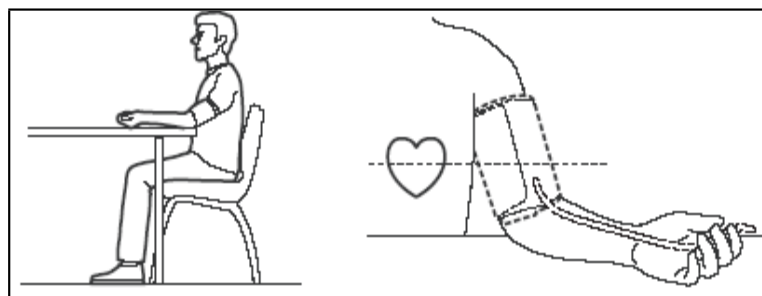
These situations could lead to higher blood pressure values due to strain or the arm cuff being lower than the heart. If the arm cuff is at a lower position than the respondent's heart, use cushions or pillow to adjust the height of the respondent's arm.



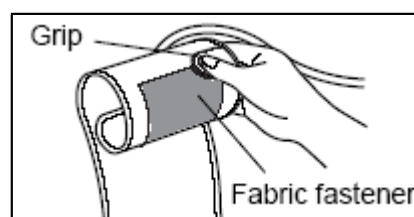
1. Insert the air plug into the air jack (on the left side of the device). The cuff must be fully deflated when it is inserted into the air jack.

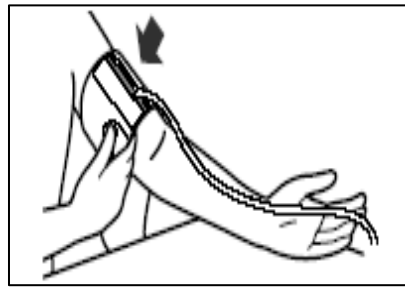
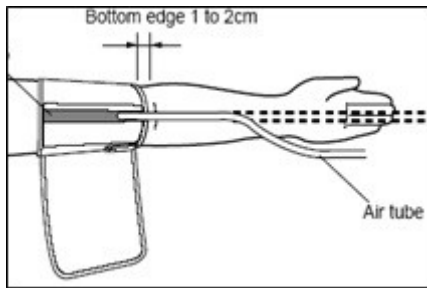


2. Have the respondent sit in a chair with her/his feet flat on the floor and place her/his arm on a table so that the cuff will be at the same level as her/his heart.



3. Hold the grip on the cuff securely with your hand.
4. Turn the palm of the respondent's hand upward.

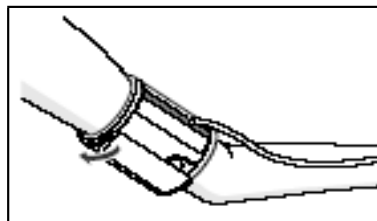




5. Apply the cuff to the respondent's upper arm so that the air tube is centered on the middle of the respondent's inner arm and points down the inside of the arm. The air tube should run down the inside of the respondent's forearm and be in line with her/his middle finger.

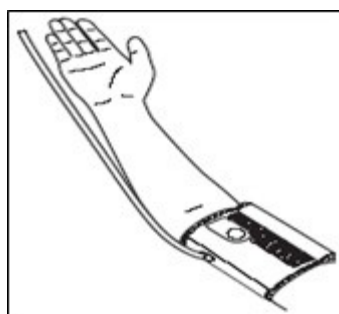
The bottom of the cuff should be approximately 1 to 2 cm above the elbow.

6. When the cuff is positioned correctly, close the fabric fastener firmly.



- Make certain the cuff fits snugly around the arm.
- The cuff should make good contact with the respondent's skin. You should be able to fit your index finger between the cuff and the respondent's arm easily, so you can pull the cuff off and on.
- Make sure that there are no kinks in the air tubing.

### **Measurements on the right arm**



**Note the following points when applying the cuff to your right arm. Apply the cuff so that the air tube is at the side of the respondent's elbow.**

- Be careful not to rest your arm on the air tube, or otherwise restrict the flow of air to the cuff.
- Apply the arm cuff so that no part of the cuff is positioned over the elbow joint. The cuff should be 1 to 2 cm above the elbow.

## DETERMINING THE CUFF SIZE

Before the blood pressure measurement, the health technician will measure the upper arm circumference to determine the blood pressure cuff size. Using the correct size cuff is important for obtaining an accurate blood pressure reading. If the cuff is too large for the respondent, the blood pressure reading will be lower than the true value. If the cuff is too small, the blood pressure reading will be higher than the true value. Measure the circumference of the bare upper arm at the midpoint using measuring tape. Use the circumference measured to determine the required cuff size.

SMALL: 17 CM – 22 CM

MEDIUM: 23 CM – 31 CM


LARGE: 32 CM – 42 CM

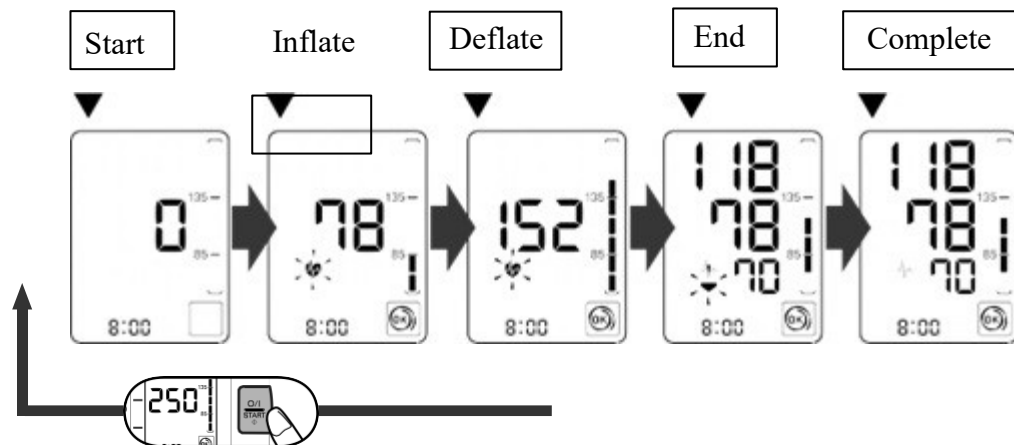


Upper arm circumference

## TAKING A BLOOD PRESSURE READING

For NFHS-6, OMRON BP Monitor will be used for respondents with small, medium and large arm circumference.

1. Measure the respondent's arm circumference (as described above) to enable you select the correct cuff size for use. Press the **START** button and ask the respondent to remain still; the cuff will start to inflate automatically. As the cuff begins to inflate, the monitor automatically determines the ideal inflation level. The respondent should remain still and not talk until the measurement is completed. Communicate to the respondent that he/she may experience a squeeze in their arm but it won't hurt.
2. Inflation stops automatically and measurement is started. As the cuff slowly deflates, decreasing numbers appear on the display and the Heartbeat display  flashes at every heartbeat. In rare circumstances, the monitor might re-inflate the cuff to continue with the measurement.








3. When the measurement is complete, the arm cuff completely deflates and the blood pressure [and pulse rate] readings are displayed. Record the systolic and diastolic readings in the appropriate boxes.
4. Remove the arm cuff from the respondent's arm.
5. After the measurement is completed, you can either press the O/I start button to turn the monitor off or it will shut off automatically after 5 minutes.








### Safety and precaution:

1. Do not use the instrument close to strong electromagnetic fields such as **mobile telephones or radio installations**.
2. If the instrument is not going to be used for a prolonged period, the batteries should be removed.
3. Do not open the instrument.
4. Do not inflate the cuff if it is not wrapped around the respondent's arm.

### WHAT DISPLAY SYMBOLS AND ERROR MESSAGES MEAN

Error Display	Cause	Remedy
	Irregular or weak pulses are detected.	Remove the arm cuff. Wait 2-3 minutes and then take another measurement. If this error continues to appear, contact your doctor.
	Movement during measurement.	Carefully repeat the steps measurement.
	Cuff is not applied correctly.	Apply the arm cuff correctly.
 Blink	The batteries are low.	You should replace them with new ones ahead of time.
 Lit	The batteries are exhausted.	You should replace them with new ones at once.

Error Display	Cause	Remedy
	Irregular or weak pulses are detected.	Remove the arm cuff. Wait 2-3 minutes and then take another measurement. If this error continues to appear, contact your doctor.
	Movement during measurement.	Carefully repeat the steps measurement.
	Cuff is not applied correctly.	Apply the arm cuff correctly.
 Blink	The batteries are low.	You should replace them with new ones ahead of time.
 Lit	The batteries are exhausted.	You should replace them with new ones at once.

Error Display	Cause	Remedy
EE	Cuff is under inflated.	Carefully read and repeat the steps listed under taking BP measurement
E	Movement during measurement.	Repeat measurement. Remain still and do not talk during measurement. Refer to section 3.3.
	Air plug disconnected.	Insert the air plug securely.
	Arm cuff not applied correctly.	Apply the arm cuff correctly.
	Clothing is interfering with the arm cuff.	Remove any clothing interfering with the arm cuff.
	Air is leaking from the arm cuff.	Replace cuff with new one.
EEE	The arm cuff was inflated above 299 mmHg when inflating the cuff manually.	Do not inflate the arm cuff above 299 mmHg.
EEs	Device error.	Contact your OMRON retail outlet or distributor.
<b>Note:</b> The irregular heartbeat symbol ( ) may also be displayed with error messages.		

Other than these, additional error E2 (technical error) was observed during the field practice. It is usually caused due to movement of hands, any underlying infection or twitching in arm.

### Troubleshooting

Problem	Cause	Remedy
The reading is extremely low (or high).	Arm cuff not applied correctly.	Apply the arm cuff correctly.
	Movement or talking during measurement.	Remain still and do not talk during measurement.
	Clothing is interfering with the arm cuff.	Remove any clothing interfering with the arm cuff.
Arm cuff pressure does not rise.	The air tube is not securely connected into the main unit.	Make sure that the air tube is connected securely.
	Air is leaking from the arm cuff.	Replace the arm cuff with a new one.
Arm cuff deflates too soon.	The arm cuff is loose.	Apply the cuff correctly so that it is firmly wrapped around the arm.
Cannot measure or readings are too low or too high.	The arm cuff has not been inflated sufficiently.	Inflate the cuff so that it is 30 to 40 mm Hg above your previous measurement result.

Nothing happens when you press the buttons.	The batteries are empty.	Replace the batteries with new ones.
	The batteries have been inserted incorrectly.	Insert the batteries with the correct (+/-) polarity.
Other problems.	<ul style="list-style-type: none"> <li>Press the O/I START button and repeat measurement.</li> <li>If the problem continues, try replacing the batteries with new ones.</li> </ul> If this still does not solve the problem, contact your OMRON retail outlet or distributor.	

## CHAPTER 4: GENERAL PROCEDURES FOR COLLECTING CAPILLARY BLOOD DROP SAMPLES FROM ADULTS AND CHILDREN

Capillary blood will be collected in NFHS-6 to test for the following biomarkers: random blood glucose (risk for diabetes HIV, Hepatitis-B and Hepatitis-C prevalence in the population, Capillary blood can be obtained from the palm side of the end of a finger. This chapter describes the materials needed for, and the steps involved in, obtaining a capillary blood sample from adults and children.

### MATERIALS AND SUPPLIES FOR PERFORMING FINGERPRICK

The capillary blood drop(s) collected for biomarker testing will be drawn from a finger. The following supplies and materials will be used in performing the finger prick:

1. **Disposable gloves:** used to reduce the risk of blood borne diseases. Gloves must be worn by the health investigators and by anyone else who may assist with the blood collection.
2. **Absorbent paper sheets:** the surface area where your supplies will be placed while you conduct the blood collection. Be sure to place the plastic side of the absorbent sheet down/the absorbent side up.
3. **Alcohol preps:** used for cleaning the skin prior to pricking the finger.
4. **Safety lancets:** the lancet is a single-use, disposable device used to prick the fingertip (Figure 4.1). The needle is retractable: when the trigger is pressed, a surgical blade quickly protrudes from the device, punctures the skin, and then automatically retracts. The Unistik 3 Normal lancets have a gauge of 23G and a depth of 1.8mm. This lancet can be used for both children and adults.



Figure 4.1 Example of safety lan

#### Preparation of lancet for use:

Hold the lancet by the sides, taking care NOT to press down on the release button. Just twist off the protective sterile cap full circle, do not pull the cap off or the lancet will not trigger, and the lancet is ready to use.



5. **Sterile gauze pads:** used to wipe away the first drop(s) of blood which helps to stimulate blood flow.
6. **Adhesive bandages (plaster or Band-Aid):** used to cover the puncture site to minimize the risk of infection.
7. **Sharps container:** A sharps container is a hard plastic container that will be used to safely dispose of lancets.

8. **Plastic bag for waste:** Large bags that are provided to hold all of the other biohazardous waste generated during the day. All waste bags are to be clearly labelled 'biohazard'.

### STEPS IN OBTAINING CAPILLARY BLOOD FROM THE FINGER OF ADULTS FOR BLOOD GLUCOSE, HIV, HEPATITIS-B AND HEPATITIS-C TESTING

The following describes the steps that are involved in obtaining a capillary blood drop sample from the finger.

1. Complete general preparation

- If possible, find an indoor site to encourage privacy. If available, use a table or other piece of furniture with a flat surface to lay out your supplies. A couch, bed or mat should be readily available in the event 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.
- When and where possible, wash and dry your hands. **Always put on gloves** before touching the supplies or beginning the collection of the blood sample from the first respondent.
- Take out a clean **absorbent paper sheet** and spread it over a flat surface where you will lay out your supplies.
- Refer to the **Biomarker Questionnaire for adults** to confirm the number of eligible individuals for whom blood samples will be collected. After going through the Biomarker Questionnaire and obtaining informed consent, **take out the appropriate equipment and general supplies for that respondent prior to testing**. You will want to have all general materials in easy reach when you begin collecting blood samples from the respondents.

2. Select and prepare the prick site

- Blood collection 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 blood from the left hand, place yourself to the right side of the respondent.
- Only use the third or fourth finger for collecting the blood (Figure 4.2). 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. You can ask the respondent to remove the ring.

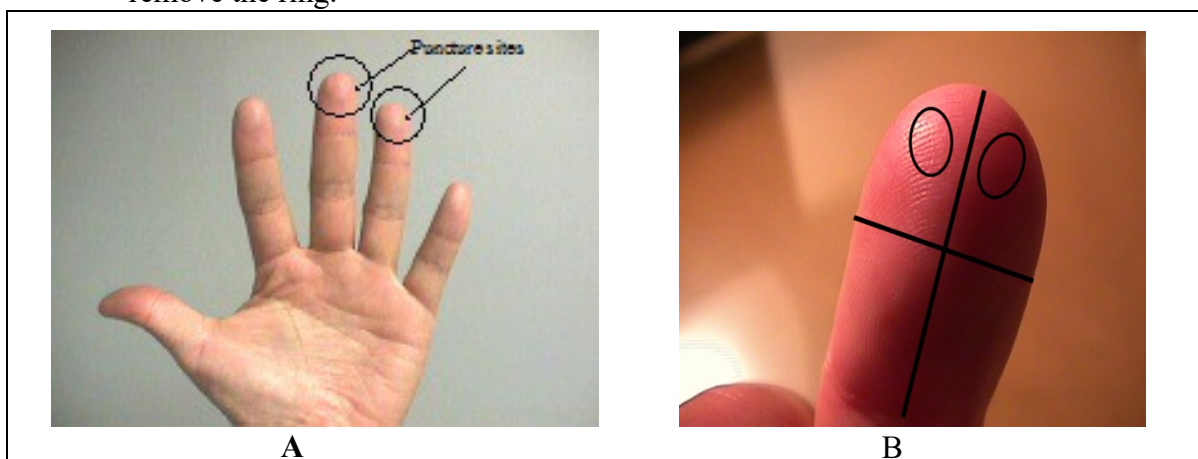


Figure 4.2 Fingers for blood collection

- **Ask the respondent to warm her fingers by rubbing the palms together briskly until the skin becomes warm.** This will increase blood flow to the fingertip and improve the ease with which a sample can be obtained.

- **Prepare the lancet for use**

- Simply twist the blade slot cover 360° until the cover comes out.
- ***Do not remove the blade slot cover from the lancet other than as instructed above,*** as this may cause the blade not to pierce the skin.



**Figure 4.3 clean the finger**

- **With an alcohol swab, clean the skin of the finger thoroughly (Figure 4.3).** If the swab is stained (with dirt), clean the finger a second time or until the swab is no longer stained. Allow the alcohol to air dry. Do not blow on the area to dry the alcohol. Blowing may deposit bacteria on the skin and contaminate the prick site.

### 3. Prick the Finger

- **Make sure that the finger is below the level of the respondent's heart** to increase the flow of blood to the finger. With your thumb, gently push the blood from the top knuckle toward the fingertip.
- When your thumb reaches the fingertip, **maintain a gentle pressure to trap the blood in the fingertip.**



**Figure 4.4 Placement of lancet**

- Place the lancet **firmly** against the skin with **the trigger facing upwards, so that the arrow preceding the trigger is visible** (Figure 4.4).
- **Note:** Avoid placing the lancet on the very tip of the finger or the sides beyond the palmar area or you will risk piercing the underlying bone. Proper puncture sites are shown in Figure 4.5.



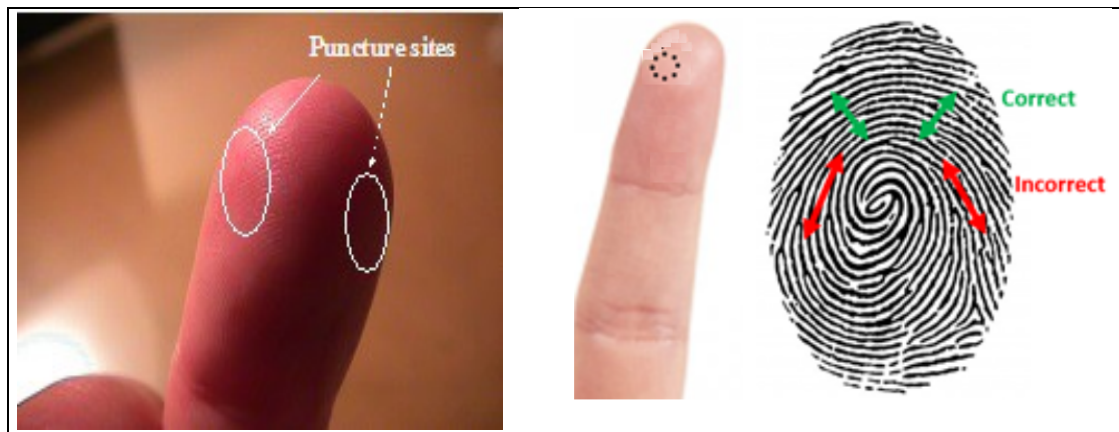


Figure 4.5 Puncture sites on the finger

- Use the lancet to prick the skin by placing the blade-slot surface against the area and pressing the trigger. The tip of the blade ejects through the blade slot, producing a micro-incision in the skin, and immediately retracts into the device. After pricking the skin, discard the lancet in the sharps container.
4. Collect the blood drops
    - When the blood appears, use a sterile gauze pad to wipe away *the first one or two well-formed drops of blood depending on the tests being performed.*
    - If the blood stops flowing before you have collected at least the blood drops needed for the tests that are being done, the pricking procedure may be repeated with the respondent's consent. For minors, you must get consent from the parent or adult responsible for the child. ***Do not reuse any of the supplies used for the first finger prick.***
  5. After the blood collection, discard all used materials in the sharps container (for lancets) or the biohazardous waste bag.

#### STEPS IN OBTAINING CAPILLARY BLOOD FROM CHILDREN 48-71 MONTHS OLD

Capillary blood will be collected in NFHS-6 from children age 48-71 months to test for **Hepatitis-B**. Capillary blood can be obtained from the palm side of the end of a finger. **The steps in obtaining the blood sample are the same as those for an adult.**

#### NOTE:

1. **For children, describe to the parent or responsible adult exactly what will be done during the collection of the blood sample and how they can assist by holding the child on**

their lap and holding the child's hand during the collection of the sample.

2. When collecting blood from a child, note that the child may be fearful or anxious about what is going to happen. Therefore, using a calm and reassuring manner is important as you begin to collect the blood sample. Remember that nonverbal communication is important, so maintain eye contact with the child as you prepare to take the sample. Encourage the parent/responsible adult to hold the child on his or her lap and place the child's legs in between his or hers so that the child does not kick the table and place his or her arms around the child as shown in Fig 4.6.

**Figure 4.6 How a parent should hold a child for a finger prick.**



3. Ask the parent/responsible adult to warm the child's hand by briskly rubbing the child's fingers in between their palms.



4. It may be helpful if the parent or responsible adult assists by holding the child's hand while pushing blood from the base of the finger to the tip.

## PRECAUTIONS TO OBSERVE WHEN COLLECTING BLOOD SAMPLES

This section describes the universal (general) precautions to be followed during blood collection<sup>3,4</sup>. You should take precautions when collecting blood to prevent exposure to blood borne infections, such as Hepatitis B or human immunodeficiency virus (HIV). When handling biological fluids, such as blood during the biomarker testing, the following rules should be followed to minimize your exposure to potentially biohazardous materials, thereby decreasing your chances of 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, until the specimen(s) from a respondent is collected, and all waste materials produced during the collection are disposed of. At that point, the gloves used should be treated as biohazardous waste. A new pair of gloves should be used with each respondent. 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 pricks. Safety lancet devices reduce the risk of penetrating injuries.
- 2. Lancets** should not be used for purposes other than pricking the finger. 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 the sharps container.
- 3. Wash** any skin surfaces or mucus membranes that become contaminated with blood immediately and thoroughly with running water or copious amounts of standing water.
- 4. Never eat or drink during the testing.** Since eating and drinking may result in you contaminating yourself, they are not permitted during blood glucose measurements or collection of blood samples for DBS preparation. And for similar reasons, you should not apply make-up during the biomarker testing.
- 5. Properly dispose of all biohazardous materials.** All materials coming in contact with blood must be placed in a sharps container or a biohazardous waste bag after use and disposed according to the survey's policy on infectious waste disposal. Take precautions when storing and transporting the waste during the fieldwork.

## GOOD BLOOD COLLECTION PRACTICES

- **Good position in relation to the respondent.** Position yourself well before you puncture the respondent's finger.
- **Do not prick the finger if the hand is cold!** Warm the hands by asking the respondent to rub them together vigorously. In the case of a child, ask the mother to rub the child's hands.

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<sup>3</sup> Adapted from National Committee for Clinical Laboratory Standards (NCCLS) 1997

<sup>4</sup> For the universal precautions regarding blood borne 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 blood borne pathogen.



- **Never ‘milk’ the finger.** Excessive massaging or squeezing of the finger will cause tissue juice to mix with and dilute the blood. This will result in erroneous test results. Instead, employ only mild pressure by using the thumb and the second and third fingers to make a ‘pad’ at the puncture site.
- **Never allow alcohol to mix with the blood.** Alcohol, which is used to clean the puncture site, can mix with the blood and cause hemolysis (the rupture or destruction of red blood cells) of the sample leading to errors in the testing results. To avoid this problem, the finger must be air dried completely before being punctured.
- **Avoid obstructing the blood flow to the fingertip.** It is important to hold the finger properly to allow for the accumulation of blood in the tip of the finger. Holding the finger too tightly can obstruct the blood flow to the finger, which will prevent you from getting an adequate volume of blood for testing.
- **Avoid shallow punctures.** A deep puncture should be made for better blood flow and to have a blood sample that is representative of that in the body.

#### **Summary of Steps for Capillary Blood Collection**

- Set up blood collection supplies
- Clean the surface of finger
- Prick the finger
- Collect capillary blood
- Never ‘milk’ the finger
- Dispose of all used materials in the sharps container (lancet) or the bag provided for biohazardous waste

## **CHAPTER 5: BLOOD GLUCOSE TESTING**

### **INTRODUCTION**

Diabetes (diabetes mellitus) is a set of metabolic disorders that is characterized by hyperglycemia (elevated blood glucose levels) due to defective insulin secretion, ineffective insulin action, or a combination of the two. Early symptoms of hyperglycemia may include polyuria, polydipsia, weight loss and blurred vision. Long-term complications of diabetes include retinopathy, loss of vision, kidney failure, and wounds that do not heal (or heal very slowly). Consequently, diabetes is the major cause of non-traumatic amputations of the lower limbs, blindness, and kidney disease worldwide. Glucose is derived primarily from digestion of carbohydrates and is the principal source of energy for cells. Insulin is required for the transfer of glucose from the blood into cells where it can be utilized for energy. Impairment of the glucose transporting mechanism, because of insufficient insulin (autoimmune disease), cancer of the pancreas, viruses, drugs, or insulin that does not work properly (obesity, inactivity) may lead to diabetes.

### **CAUSES OF DIABETES**

Diabetes is a poorly understood condition and the cause(s) of the disorder is/are not clearly known. Diabetes may be classified into two primary groups based on the etiology of the disease: Type 1 diabetes and Type 2 diabetes. Type 2 diabetes mellitus is the most common form of diabetes and is strongly linked to obesity and a sedentary life style. Individuals with a family history of diabetes are more likely to develop the condition than the general population. In addition to lifestyle factors, diabetes mellitus (type 2 diabetes) may result from trauma to the pancreas, endocrine disorders (hyperthyroidism; Cushing's syndrome), prescription drugs and infections (congenital rubella). The underlying cause of type 2 diabetes is a deficiency in insulin secretion and/or insulin that is partially effective in removing glucose from the blood and into cells. Treatment options range from weight reduction to drugs that promote the secretion of insulin or enhance its effectiveness. Type 1 diabetes is characterized by a lack of insulin due to destruction of the beta cells of the pancreas. Individuals with type 1 diabetes require exogenous insulin for survival.

### **BLOOD GLUCOSE TESTING IN NFHS-6**

All women and men age 15 and above in a household are eligible for blood glucose testing in NFHS-6. Health investigators should keep in mind that random blood glucose testing is done at any time of the day in combination with other biomarkers that the respondent has given her/his consent. It is also important to note that the NFHS-6 random blood glucose tests cannot be used to diagnose actual diabetes.

## GENERAL PROCEDURE IN CONDUCTING THE RANDOM BLOOD GLUCOSE TEST

This chapter discusses the materials needed and the procedure for random blood glucose testing. In addition, directions are given regarding precautions to take during blood collection and testing, recording results in the Biomarker Questionnaire, and providing test results to the respondents in a brochure and a referral form to a local health facility if necessary.

### MATERIALS AND SUPPLIES FOR BLOOD GLUCOSE TESTING

In addition to the Biomarker Questionnaire and supplies listed in Chapter 4, the following equipment and supplies are required for random blood glucose level measurement.

SD CodeFree with glucose test strips will be used in NFHS-6 to measure random blood glucose. This equipment provides laboratory quality analysis of glucose with capillary blood. The results of the glucose test are displayed as whole blood glucose. The standard way of reporting glucose measurement in blood is as plasma glucose. The blood plasma glucose level is about 11% higher than the level in whole blood. The conversion of whole blood glucose to plasma glucose will be calculated during data processing. The health investigators will record in the Biomarker Questionnaire the measured blood glucose value on the glucometer display.

#### The components of the glucose testing:

##### 1. SD CodeFree

The glucometer is a device for measuring the concentration of glucose in the blood (Figure 5.1/5.2). Its measurement of the blood glucose level is equivalent to the glucose levels using the glucose oxidase laboratory technique, in the range of 10-600 mg/dL (1.1 – 27.8 mmol/L). The advantage of the glucometer is that results are available in 5 seconds on an LCD digital display which can be immediately communicated to respondents. A very small volume of blood is required for the blood glucose measurement. This device is suitable for use as point-of care equipment. A small drop of blood obtained from a finger prick is used by a disposable glucose test strip and is read by the glucometer. The glucometer then displays the results of the glucose measurement in **mg/dL**.



Figure 5.1 Glucometer

## 2. Disposable test strip

This is a plastic test strip with a small spot impregnated with glucose oxidase and other components (Figure 5.2). Each disposable test strip is used once and then discarded. A blood drop is put on the end of a glucose strip after the strip has been inserted in the glucometer. Usually, the test strips come in packs of 50 strips per vial.



Figure 5.2 Glucometer with Disposable strips

### Control Solutions (supplementary reagents not included in the kit)

Control solution check ensures that you are doing a test correctly and that your system is working properly. Make sure you use the proper control solution for the test strips you have: SD CodeFree® blood glucose test strips require STANDARD™ Glucose Control Solution.

Control tests are used to ensure the device and test strips are working properly. It is advisable to perform control tests in following scenarios:

- You left the test strip container open or you think your test strips have been damaged.
- Your test strips were stored in extreme temperatures and/ or humidity.
- You want to check the meter and test strips.
- You dropped the meter.
- You want to check if you are testing correctly.

### Using Control Solution

Important notes to remember:

- Use only STANDARD Glucose Control Solution.
- Check the expiration date on the control solution container.
- Record the opening date on the container label. Do Not use after expiration or discard date (date opened plus three months), whichever comes first.
- Control solution, meter, and test strips should be at room temperature 18-30°C (64-86°F) before testing with control solution.
- Shake the container, discard the first drop of control solution, and wipe off the tip to ensure a proper sample and an accurate result.
- Store control solution tightly closed at temperatures between 8-30°C (46-86°F). Do Not refrigerate.

## Performing a Control Solution Test

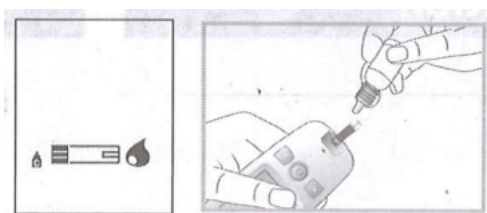
You need the meter, a test strip, and control solution Level M or Level H. The control level is printed on the test strip label.

### STEP-1:

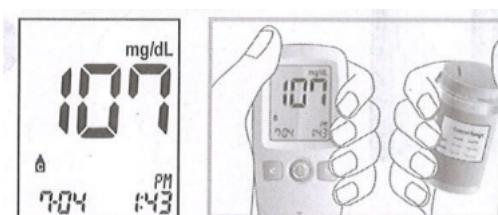
- 1) Remove a new test strip from container. Be sure to tightly replace container cap after removing test strip.
- 2) Insert a test strip (yellow window printed arrow symbol facing up) into test strip slot. The meter turns on automatically.

### STEP-2:

- 1) Press the left button for 3 seconds to check the testing system using a control solution in Blood Stand by Display. If you don't want a control solution check, press the left button again.
- 2) Shake the control solution container and discard the first drop of solution. Gently squeeze the container to form one small drop. Bring the drop to the edge of the strip, and allow the strip to automatically draw the control solution into the yellow window. When control solution is applied to the test strip, the meter counts down from 5 to 1 second on the display. Tightly replace the cap on control solution.



- 3) The control solution result appears on the display in just 5 seconds.
- 4) Compare control solution result to the range printed on the test strip container. If the results are not within the control range printed on the test strip container, then the meter and strips may not be working properly. Repeat the control solution test.



- 5) Remove the used test strip for control solution from the meter and discard it.

## STEPS FOR MEASURING RANDOM BLOOD GLUCOSE LEVEL USING THE SD CodeFree INSTRUMENT

- 1) Check the expiration date on the container, if the strips have not expired, remove a strip from the container and close the container tightly.

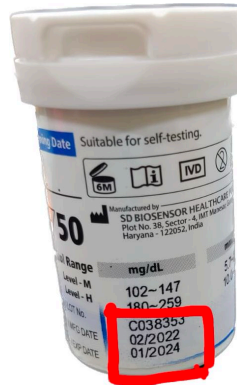


Figure 5.3 Check expiration date

- 2) Insert the test strip into the meter with the contact bars and arrow facing up until it stops. This turns on the meter automatically.  
*Note: The meter turns off after 3 minutes of inactivity. Remove and reinsert the unused test strip to restart the meter.*

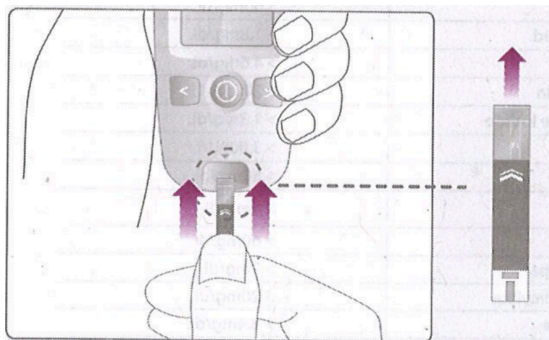


Figure 5.4 Insert glucose test strip in glucometer

- 3) This display always appears when the meter is turned ON. Do not use the meter if the display check screen does not exactly match the example. If this happens, ask IIPS to contact Customer Service.



Figure 5.5 glucometer screen check

- 4) The 'Apply Sample' symbol appears next, indicating the meter is ready for you to apply a sample to the test strip.



Figure 5.6 'Apply Sample' symbols on glucometer display

- 5) Obtain a Blood Sample: Select a test site. Use the retractable safety lancet to obtain a blood sample. Wipe away the first drop of blood and use the SECOND drop for glucose testing.

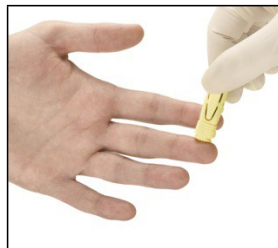


Figure 5.7 Prick finger

- 6) Apply blood to the test strip by bringing the blood drop to the white area at the end of the test strip. The blood is drawn into the test strip.



Figure 5.8 Collect blood in to glucose test strip

- 7) Hold the blood drop to the yellow area until the meter beeps (if sound is on) and the countdown appears on the display. This indicates the test strip has obtained enough blood.



Figure 5.9 Test strip has required blood volume

- 8) The countdown appears on the display as the meter checks your glucose level. Note: Do not remove the test strip from the meter or disturb the test strip during the countdown.




Figure 5.10 5 seconds to result

- 9) The meter beeps (if sound is on) when the result appears on the display. The test is complete (see figure). Record this result in your Biomarker Questionnaire. The result is also stored in memory of the SD CodeFree glucometer device.


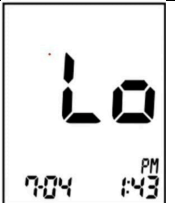





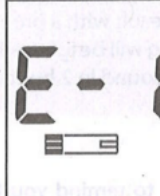

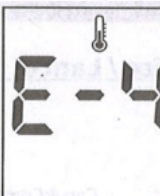

Figure 5.11 Blood glucose results on display screen



- 10) Turn off the meter by removing the used test strip from the glucometer. Discard the used test strip in a biohazard bag. **Note:** You can also press and hold  for at least 2 seconds to turn off the meter. The meter also turns off after 5 seconds of inactivity.
- 11) The meter displays results in mg/dL or mmol/L. The unit of measurement is preset by the manufacturer. You cannot change this setting. Check for the setting on the sticker on the back of the meter.
- 12) The meter displays results from 10–600 mg/dL (1.1–27.8 mmol/L). Low or high blood glucose results can indicate a potentially serious medical condition.
- 13) **In case of delay of more than 3 minutes of inactivity before applying blood to the glucose strip**, the glucometer turns off. Do not panic, simply remove and reinsert the unused strip into the glucometer to restart the meter.
- 14) Stop the bleeding at the prick site with a sterile gauze pad.
- 15) Record the results of the random blood glucose measurement in the Biomarker Questionnaire for women and men in **Q374/474**, respectively.
- 16) Record the respondent's random blood glucose level in the blood glucose brochure. Explain the results to the respondent and (if adolescent) the parent/responsible adult. Each respondent should have a blood glucose brochure with their results recorded.
- 17) **Provide a referral form to a health facility for additional medical evaluation for any respondent with a random blood glucose level  $\geq 200$  mg/dL.**
- 18) Discard lancets in a sharps container and discard glucose strips, alcohol swabs, gauze, and gloves in the biohazard bag. At the end of the day, follow the procedures described in Chapter 9 for the proper disposal of waste materials.

## ERROR MESSAGES & TROUBLESHOOTING

	Blood glucose may be higher than the measuring range of the meter
	Blood glucose may be lower than the measuring range of the meter

	<p>If there isn't any problem with the meter, 'OK' message appears on the screen</p>
	<p><b>(Replace Battery)</b> When the low battery icon flashes you must replace the battery immediately. If you press the ON/OFF button after the battery is discharged, the battery icon will flash and the meter will turn off automatically after ten seconds</p>
	<p><b>(Internal Error Message for a Meter)</b> Turn off the meter again. If the error message persists, please contact IIPS</p>
	<p><b>(Strip Error)</b> Defective test strip or the test strip is damaged or inserted improperly. Discard the strip and test again using the new strip.</p>
	<p><b>(Blood Sample Error)</b> An insufficient amount of blood was applied. Discard the test strip and test again using new test strip and a larger sample, making sure blood is placed to the narrow channel in the top edge of the test strip.</p>
	<p><b>(Temperature Error)</b> If the environmental temperature is above or below the operating range of the meter, a thermometer icon will appear on the display. Move to a location between 10-45 degree C (50-113DF) , wait 30 minutes, and then carry out the test. Do not artificially heat or cool the meter</p>
	<p><b>(Communication Error)</b> The communication between the meter and the computer has failed. Re-connect the cable between the meter and your PC.</p>

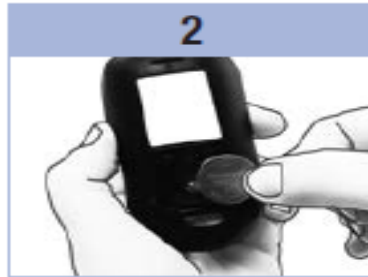
## MAINTENANCE OF THE GLUCOMETER

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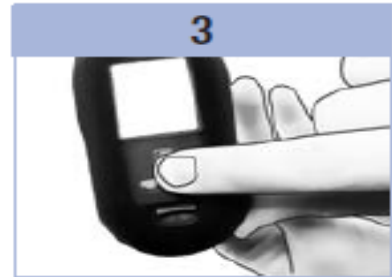
### Changing the Battery



Open the battery door on the back of the meter by pushing the tab in the direction of the arrow and pulling the door up.



Remove the old battery. Insert the new battery with the (+) side facing up.



Put the battery door back in place and snap it closed.

### CLEANING THE GLUCOMETER

1. Confirm that the meter is turned off.
2. Gently wipe the meter's surface with a cloth slightly dampened with:
  - 70% isopropyl alcohol
  - Mild dishwashing liquid mixed with water
  - 10% household bleach solution made the same day (1-part bleach to 9 parts water).

## **CHAPTER 6: DRIED BLOOD SPOT (DBS) COLLECTION FOR HIV, HEPATITIS-B AND HEPATITIS-C**

Acquired Immune Deficiency Syndrome (AIDS) is a disorder of the immune system caused by the human immunodeficiency virus (HIV). People with AIDS are vulnerable to the development of life-threatening conditions from relatively innocuous infections that people with a properly functioning immune system do not typically develop.

Most of the current information on HIV prevalence in India comes from surveillance of women attending antenatal clinics or of other special populations such as commercial sex workers or individuals treated at health facilities for sexually transmitted infections. However, surveillance data 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. Since HIV is transmitted principally through sexual contact, obtaining an estimate of HIV prevalence for both men and women will provide a better estimate of the current level of HIV in India than is available from other sources. Therefore, to estimate the national prevalence of HIV in the NFHS-6, a nationally-representative sample of women age 15-49 and men age 15-54 will be tested.

HIV testing itself does not take place in the field. Instead, blood samples are collected from a finger prick on a filter paper card, dried, transported to the designated laboratories for logging in and checking. The dried blood spots (DBS) will be stored at the laboratory until field work is completed and then processed for testing in batches.

HIV testing in NFHS-6 is anonymous. Personal identifiers are delinked from the DBS samples and respondents who agree to be tested are not told their results. Instead, respondents are given a voucher for voluntary counselling and HIV testing at a nearby health facility.

After HIV testing, blood sample from DBS collected from subsample of women age 15-49, men age 15-54, will be tested from Hepatitis B and Hepatitis C testing. For Hepatitis B estimates from children age 4-5 years, DBS will be prepared from blood samples taken from eligible children. For DBS preparation, pre-printed circles on filter paper cards will be filled with blood obtained from a finger prick for subsequent HIV, Hepatitis B, and Hepatitis C testing in a laboratory. Five pre-printed circles filter paper card will be used for women age 15-49, men age 15-54, and two pre-printed circles would be used for children aged 4-5 years old.

As part of the informed consent process, individuals who are eligible for the blood sample collection will be advised of the purposes for which the blood will be used and will be assured of the anonymity of the Hepatitis B and Hepatitis C test results. They will be told that it will not be possible to provide them with the results of the tests, but if they are interested in determining their Hepatitis B and Hepatitis C status, they will be given a voucher for free hepatitis B and Hepatitis C testing at one of the treatment sites nearest to their locale. They will also be given a referral about Hepatitis B and Hepatitis C testing (see Appendix 4). Parents or guardians of adolescents age 15-17 and children age 4-5 will be asked for permission to test the adolescent before assent of the adolescent is sought.

## MATERIALS AND SUPPLIES FOR DBS COLLECTION FOR HIV, HEPATITIS-B AND HEPATITIS-C TESTING

In addition to the supplies listed in Chapter 4, the following materials are required for DBS collection for HIV, Hepatitis B and Hepatitis C testing:

- **Filter paper card:** You will use special filter paper cards to collect the blood samples. Each card has five pre-printed circles that hold about 50 µl of blood when filled for adults (Figure 6.1) and three pre-printed circles for children (Figure 6.2).



Figure 6.1 Filter paper card for adults

The filter paper cards must be kept clean and dry at all times. Water, dust, sweat from your hands, or other environmental contaminants can affect HIV, Hepatitis B and Hepatitis C testing. Use gloves at all times when handling the filter paper cards.

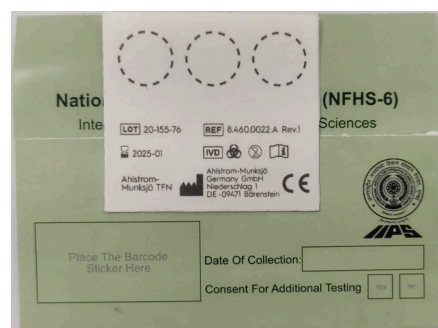


Figure 6.2 Filter paper card for children

The filter paper cards come in packets of 50 cards. Before opening a new packet, put on gloves. Open the packet and place the cards in 4-5 smaller ziploc bags; place these smaller bags in a large ziploc bag. The bags must be stored stacked to avoid compressing the filter paper. **Place a few desiccant packets and a humidity indicator card in each small bag before sealing it. You must also place desiccants and a humidity indicator card in the larger ziploc bag.** If the humidity indicator card and/or desiccants change colour before the cards have all been used, replace the humidity indicator card and desiccants following the instructions described in the **Desiccant packets** and **Humidity indicator card** sections below.

**Note:** Keeping the unused filter paper cards with desiccants in a ziploc bag will prevent moisture from being absorbed on the filter paper card which will prevent over-saturation or merging of circles when blood is collected.

- **Barcode labels:** because the HIV, Hepatitis-B and Hepatitis-C testing in NFHS-6 is anonymous, respondents' names are never written on the filter paper cards. Instead, barcode labels are used to identify the DBS samples and link them to the interview data. You will be provided with sheets of 'peel-off' adhesive barcode labels (Figure 6.3). The barcodes are arranged in rows; the codes on each label are the same across one row. **A different row of barcode labels is to be used for each respondent from whom a DBS sample is collected.**
- **Drying box:** a plastic box with a cardboard rack (Figure 6.4) positioned inside. For proper use, stand the box vertically (the filter paper cards will be positioned horizontally). The drying boxes are to be used for transport of DBS while in the field and overnight drying of DBS samples. They are not to be used for long-term sample storage.
- **Desiccant packets:** drying agents used to absorb moisture from the air to keep the filter paper cards dry (Figure 6.5). The granules inside the packets change colour from blue to pink as they absorb moisture. Change the desiccants when the granules change to a pink colour or as indicated by the humidity indicator card. Treat used desiccants as biohazardous waste and throw them away in a biohazardous waste bag.

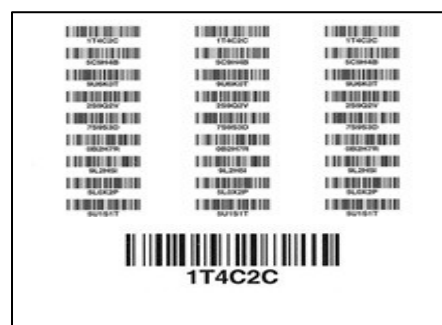


Figure 6.3 Barcode labels (sheet and individual).



Figure 6.4 Drying Box with rack



Figure 6.5 Desiccants

- **Humidity indicator cards:** cards that allow closer monitoring of the level of moisture than monitoring the colour of the desiccant packets alone.

There are three circles on the humidity indicator card (Figure 6.6). If the circle at the bottom of the card (labelled 30%) turns pink, it indicates a relatively high level of humidity and it is a warning to carefully monitor the humidity level. If the middle circle (labelled 40%) turns pink, replace the



Figure 6.6 Humidity indicator cards

desiccant packets and humidity card. If the top circle (50%) turns pink, you must examine the DBS cards as their quality might have been compromised due to the high humidity in the bag. You should replace the desiccant packets and humidity card with fresh ones.

- **Low gas-permeable bags (small Ziploc bags):** special small Ziploc bags used for storing the DBS samples prior to transfer to the lab. 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, such as carrying food or adhesive bandages. The bags have a sliding ‘zipper’ that is used to close and seal the bag.
- **Large Ziploc bags or Cluster bag:** A large Ziploc bag will be provided for each of the NFHS-6 sample clusters in which you will work. These bags will be used to hold the small Ziploc bags with DBS samples from the cluster during storage and transport to the laboratories.
- **DBS Transmittal Sheet:** accompanies the DBS samples to the laboratory. The purpose of this sheet is to track the samples from the field to their arrival in the laboratory for testing to ensure that the number of DBS samples sent to the laboratory matches the number of samples collected in the field. A barcode with the same unique identifier as the barcode label attached to the DBS sample is attached to the DBS Transmittal Sheet and in the space provided in the Biomarker Questionnaire (**Question 376 for women or Question 476 for men**). A separate transmittal sheet is to be used for adults and children. See Appendix 9 and 10 for an example of the DBS Transmittal Sheet for adults and children respectively. One transmittal sheet can only hold 30 barcodes.

## **COMBINED PROCEDURE FOR GLUCOSE TESTING, TESTING, AND DBS COLLECTION FOR HIV, HEPATITIS-B AND HEPATITIS-C TESTING**

This section focuses on the steps involved in collecting the blood samples for blood glucose testing, followed by blood collection for laboratory testing for HIV, Hepatitis-B and Hepatitis-C. When blood is collected for these tests, the order of collection is very important and must be followed very strictly. Blood is first collected for blood glucose testing and then blood is collected on a filter paper card to prepare dried blood spots for testing of HIV, Hepatitis-B and Hepatitis-C. In children age 4-5, blood is collected on a filter paper card to prepare dried blood spots for testing of Hepatitis-B. Consent for each test must be obtained separately following the order in the Biomarker Questionnaire. If consent has not been given to perform a test, follow the skip instructions as mentioned in biomarker. **You should complete the testing process for one respondent before proceeding to the next eligible individual.**

**Follow the correct procedure to collect blood sample for blood glucose testing and dried blood spot on the filter paper card:-**

- The interviewer identifies all women and men from the household schedule who are eligible for blood glucose testing and DBS collection. In approximately 15% of the clusters, women age 15–49, men age 15–54 and children age 4–5 who are usual members of the household or who stayed in the household the night before the survey are eligible are eligible for DBS collection. All women and men age 15 and above in a household are eligible for blood glucose testing.
- Interviewer records the **Name, Line Number, Age and Marital Status** of all eligible women and men in **Question 302** and **Question 401**. For children **Name, Line Number and date of birth Question 202 and Question 203** respectively in the Biomarker Questionnaire.
- When instructed, the health investigator must check the respondent's age and marital status in **Question 302/401**. You must do this step because if the respondent is age 15-17 and not in a union, or has never been in a union, he/she is an adolescent and consent for testing must be obtained from the parent or adult responsible for the adolescent, as well as the adolescent. If the respondent is in a union or has been in a union or is women age 15-49 and men 15-54 years, skip to **Question 351/450**.

**For women age 18-49 and men age 18-54 or a respondent age 15-17 who is in a union, or has been in a union:**

- Read the informed consent statement for blood glucose testing in **Question 351/450** to the respondent and record the outcome of the consent request in **Question 352/451**. If respondent does not consent to blood glucose measurement, follow the skips to **Question 360/459**.
- Check **question 360/459** in biomarker, if house hold was selected for State Module, read the informed consent statement for HIV, Hepatitis B and Hepatitis C testing to the respondent in **Question 365/464**. Record the outcome of the consent request in **Question 366/465**. Confirm that you have read the statement to the respondent and recorded their response accurately based on the instructions in the BOX. If the respondent does not consent to HIV, Hepatitis B and Hepatitis C testing, follow the skips to **Question 372A/472**.



- If in question 366/465 consent was granted then read the informed consent statement for **additional testing** to the respondent in **Question 371/470**. Record the outcome of the consent request in **Question 372/471**. Confirm that you read the statement to the respondent and recorded the response accurately based on the instructions in the BOX.
- Prepare the work station for the test for which consent was granted.
- According to **Question 366/465**, place a barcode on the filter paper card if DBS is being prepared. Refer to **Question 372/471** if additional testing was permitted, check “Yes” or “No.”

**For a respondent age 15-17 who has never been in a union (an adolescent):**

- Check and record name of his/her parent/responsible adult in **Question 307/407**
- Seek consent for blood glucose measurement from the parent/responsible adult in **Question 349/448**. Record the outcome in **question 350/449**. If consent granted in **question 350/449**, then seek consent for blood glucose from respondent in **question 351/450** and record it result in **question 352/451**.
- If in **question 350/449** parent/guardian or in **question 352/451** the adolescent respondent does not consent to blood glucose measurement, follow the skips to **Question 360/459**.
- Check **question 360/459** in biomarker, if house hold is selected for state module then read the informed consent statement for HIV, Hepatitis B and Hepatitis C **testing** to the parent/guardian in **Question 363/462** and record its outcome in **question 364/463**. If parent/guardian gives consent in **question 364/463** then seek consent of adolescent in **Question 365/464** and record it outcome in **question 366/465**.
- If in **question 364/463** the parent/guardian or in **question 366/465** the adolescent respondent does not consent to HIV, Hepatitis-B and Hepatitis-C testing, follow the skips to **Question 372A/472**.
- If consent granted in **question 366/465** then ask consent from parent/guardian for additional testing in **question 369/468** and record outcome in **question 370/469**. If consent granted in **question 370/469** then seek consent of adolescent in **question 371/470** and record it outcome in **question 372/471**.
- According to **Question 376/476** place a barcode on the filter paper card if DBS is being prepared. Refer to **Question 370/469 & Question 372/471** if additional testing was permitted, check “Yes” or “No.”
- Prepare the equipment and supplies ONLY for the tests for which consent has been granted.

**For a respondent age 4-5**

- Parents and guardians of children age 4-5 year will be asked for permission to test children.
- Check and record name of his/her parent/responsible adult in **Question 217**.

- Seek consent for DBS collection for Hepatitis-B from the parent/responsible adult in **Question 218**. The appropriate response will be recorded in **Question 219**.
- If the parent/guardian refused to test, follow the skips to **Question 224**. The information brochure will be handed over to concerned parents.
- If consent granted in **Question 219** then ask consent for additional testing from parent/other adult as responsible for child in **Question 220** and record outcome in **Question 221**.
- According to **Question 219** place a barcode on the filter paper card if DBS is being prepared. Refer to **Question 221** if additional testing was permitted, check “Yes” or “No.”
- Prepare the work station for the test if consent was granted.

- If consent for DBS was granted, identify the next available complete set (row) of barcode labels. **Wearing a pair of 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 pre-printed circle.
- ***Never handle a card with your bare hands as you may transfer sweat, dirt or other contaminants to the card.***
- Place the card with the pre-printed circles face-up on the clean absorbent 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.
- Take the **first barcode label** from the first complete row on the sheet of barcode labels and paste it in the appropriate column of the Biomarker Questionnaire containing the line number of the respondent from whom you will collect blood for DBS (**Question 222** for children **Question 376** for women or **Question 476** for men).
- Take the **second barcode label** from the same row on the sheet of barcode labels and paste it at the bottom of the filter paper card. Do not cover up or touch any part of the pre-printed circles.
- Take the **third barcode label** from the *same row* on the sheet of barcode labels and paste it on the Blood Sample Transmittal Sheet for the cluster in which you are working.
- **DO THE ABOVE STEPS CAREFULLY.** The barcode label is the only means of identifying the blood sample and for linking the DBS test results to the interview data. Mistakes will result in mismatches later on.

**CHECK THAT THE THREE MATCHING BARCODE LABELS HAVE BEEN PLACED ON THE BIOMARKER QUESTIONNAIRE, FILTER PAPER CARD AND THE TRANSMITTAL SHEET BEFORE YOU PROCEED TO COLLECT BLOOD DROPS FROM THE RESPONDENT.**

**Note that the blood collection and test order for combined blood glucose, and DBS collection is as follows:**

After pricking the finger in adults:

- First large blood drop: wipe away.
- Second blood drop into the glucose strip.
- Third, fourth, fifth, sixth and seventh blood drops on the filter paper card.
- Wipe off excess blood on skin.

In the children age 4-5 years:

- First large blood drop: wipe away.
- Second and third blood drop on the filter paper card.
- Wipe off excess blood on skin.

### Obtaining Blood from the Finger as follows:

- 1) Follow the steps for producing a finger stick blood sample as described in Chapter 4. Use a sterile gauze pad to wipe away the first blood drop. 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 form a second drop (Figure 6.7). Be careful to **avoid ‘milking’ or ‘squeezing’ the finger** as this could affect the test results. In case of adults, allow the second drop of blood to touch the correct end of the glucose strip. Wipe away any excess blood on the skin using the sterile gauze.
- 2) Immediately continue collecting blood for filling the circles on the filter paper cards.
- 3) Position of Filter Paper Card
  - Move the card underneath the finger, with the pre-printed side of the card facing the pricked finger.
  - The card must not be pressed against the prick 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
- 4) Blood Collection on the card:
  - Wait until the drop is large enough to fill one of the pre-printed circles. Let the blood drop fall freely in the centre of the pre-printed circle. In case the blood drop does not fall readily, you may touch the filter paper gently against a LARGE blood drop (but not the skin). In one step, a large blood drop should be allowed to soak through and completely fill the circle.
  - You must continue to collect drops of blood until you have fully saturated all circles on the filter paper card (Figure 6.9). All five blood spots are obligatory. In the children two blood spot are obligatory (Figure 6.8).

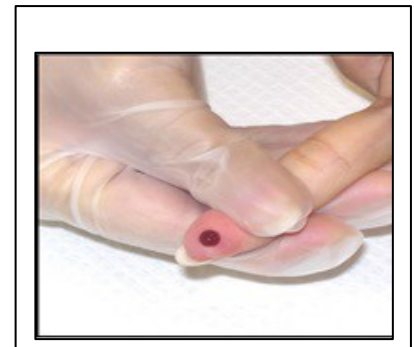


Figure 6.7 Large drop of blood



Figure 6.8 2 large drops of blood for children in the 4 to 5 age group

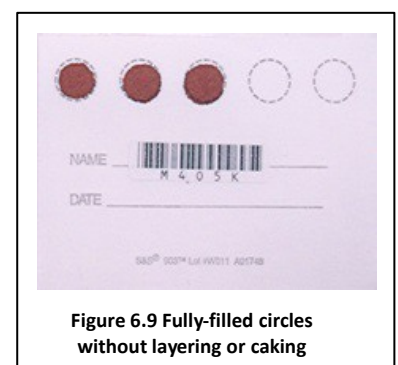


Figure 6.9 Fully-filled circles without layering or caking

- To enhance blood flow, gently apply intermittent pressure to the area surrounding the prick site to get a third drop. Allow sufficient time for a large blood drop to form before filling the next circle on the filter paper card. Again, avoid milking or squeezing the finger.
  - If the blood flow stops or decreases before you fully saturate five 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.
  - After collecting five spots on the filter paper card (Figure 6.10.), place the filter paper card with the blood spots on the absorbent paper sheet away from other items. Wipe away any excess blood on the skin using the sterile gauze.
- 5) Take an adhesive bandage from its wrapper and apply it to the prick site.
- 6) Record the **blood glucose results** in **Question 374/474**.  
If a blood glucose measurement was not obtained because the respondent did not consent to the test, or there was a technical problem with the testing, circle the appropriate code
- 7) Place the filter paper card with blood spots in the drying box:
- The drying box should always be placed vertically on a flat surface before opening.
  - After opening it, carefully pick up the filter paper card opposite the wet blood spots and place the card in a horizontal position in one of the slots in the drying rack affixed to the inside of the box. The blood spots should face towards the back of the drying box.
  - The placement of the box is especially important for filter paper cards that have not dried completely. Keep the box in a vertical position so that the cards do not fall out of their slots. To prevent blood that has not dried completely from spreading, place the box vertically.
  - 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 the same slot in the drying rack. Allow the blood spots to dry overnight at ambient temperature. Never set any materials on top of the open box as they might contaminate the filter paper cards stored inside.
  - If the collection process in a household is interrupted for any reason, you should close the box to prevent any possible contamination.
  - After the DBS samples for each respondent have been collected, carefully close the box. The drying box should be kept in a position so that the filter paper cards remain in their slots inside the box.

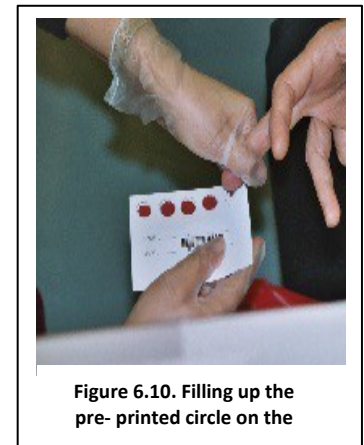
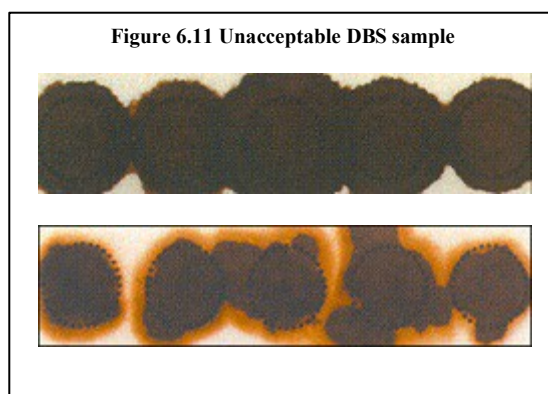


Figure 6.10. Filling up the pre- printed circle on the

- 8) Collect biohazardous waste  
Place used lancets in a sharps container and other biohazardous waste (alcohol swabs, gauzes, glucose strip, and gloves) into a clearly labelled 'biohazard' plastic bag, which has been provided for field disposal of these items. Before leaving the enumeration area (cluster) the bags with biohazardous waste must be taken to a health facility and incinerated.
- 9) Record the respondent's blood glucose results in the appropriate informational brochures.
- 10) Inform the respondent of her/his blood glucose results and provide the blood glucose brochures.
- 11) Provide a written referral to a health facility for medical evaluation for any respondents with a random blood glucose level  $\geq 200\text{mg/dL}$ .
- 12) All the respondents from whom DBS has been collected will be provided with an information brochure & referral form for testing of HIV, Hepatitis-B and Hepatitis-C. (Refer to APPENDIX 4 & 6).

#### **PRECAUTIONS TO TAKE DURING DBS COLLECTION FOR HIV, HEPATITIS-B AND HEPATITIS-C TESTING**



With respect to DBS collection for the above tests, there are a number of precautions that should be strictly followed:

- Always use the pre-printed side of the card to collect the blood spots.
- Do not 'layer' the sample in an attempt to fill in the circle.
- Do not overfill the circles. Overfilling the circles can cause super saturation (top panel of Figure 6.11), which is unacceptable.
- Do not place the drying box horizontally until blood dries. Placing the box horizontally before the blood dries can cause serum rings (bottom panel of Figure 6.11), which is also unacceptable. The blood should not extend beyond the pre-printed area, as shown in Figure 6.11.
- Try to have the blood drop fall exactly in the centre of the pre-printed circle. Note: all circles should be uniformly filled.

- Protect the filter card from contamination. Do not allow water or other contaminants to come into contact with the filter paper card before or after collecting the blood samples
- Do not place the specimens in the small ziploc bags until the blood has dried thoroughly (chocolate brown). Insufficient drying adversely affects the quality of the samples and, consequently, the test results.
- Taking the filter paper card out of the storage bag. The filter paper card should be the last item taken out of the package before starting the blood collection procedure.

The dried blood spot (DBS) samples must be properly maintained until they are picked up and taken to the laboratory. They should never be exposed to direct sunlight, stored in a humid environment, or exposed to dust, dirt or other environmental contaminants. During storage, it is important to regularly monitor the level of humidity in the stored samples by observing a change in color of the desiccant granules or the humidity indicating card. The following describes the steps that should be followed in storing the DBS samples in the field and their subsequent transfer to the laboratories.

### 1) Storage:

Each morning, before you go to the field, you must remove the filter paper cards with the DBS samples that you collected on the previous day from the drying box and, if dry, prepare them for storage as follows:

1. Put on a pair of gloves and carefully open the drying box. Check that the blood spots on each filter paper are completely dried (chocolate brown).
2. Remove each filter paper card on which the spots have dried from the drying box separately.  
Be careful not to touch the blood spots.
3. Gently fold the flap on the filter paper card over the blood spots and put one filter paper card into a small (low gas-permeable) ziplock bag. Put 2 desiccant packets and a humidity indicator card behind the filter paper card, with the circles on the humidity card and the 'window' in the desiccant sachet facing out so that the circles on the humidity indicator card, barcode, and granules, respectively, are 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 (the blood spots) should not be allowed to come in direct contact with other DBS samples during handling, shipment, or storage.**

4. Continue to package each of the filter paper cards from the previous day which have dried overnight, putting one filter paper card into one small ziploc bag with two desiccant packet and one humidity indicator card.
5. When you have packed all of the filter paper cards, put them into the large ziplock bag that has been labelled for the cluster in which the samples were collected (Figure 6.12). Note that the Cluster Sample (ziplock) Bag itself should also contain a few desiccant packets. A separate cluster bag is to be maintained for adults and children.

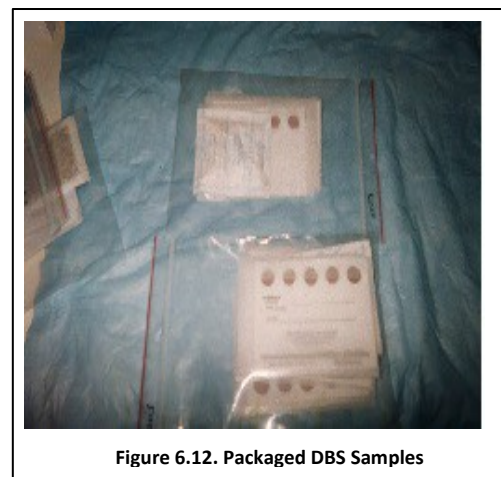


Figure 6.12. Packaged DBS Samples

6. Check the humidity indicator cards for the individually packaged DBS samples that you have previously placed in the Cluster Sample Bag before adding newly packaged DBS samples to an existing Cluster Sample Bag. **The build-up 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% humidity) is pink, gently open the small ziploc bag, remove the desiccant packet and replace it with a fresh desiccant packet. Replace the humidity indicator card as well. If the top circle (50% humidity) is pink, examine the DBS cards as this indicates a high build-up of moisture which can degrade the DBS sample. Further, 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. **Please review the storage instructions, using the humidity card as a guide.**
7. Check the condition of the desiccant packets and humidity indicator card before closing the zipper on the Cluster Sample Bag. 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.

## 2) Transfer:

The purpose of the DBS Transmittal Sheet (see Appendix 9 & 10) is to account for the samples that have been collected in each Cluster and to track the samples from the field to the laboratory.



1. Fold the DBS Transmittal Sheet along the dotted lines (so that the barcode labels are not folded), and keep it in the Sample Cluster Bag along with the DBS samples for that cluster.
2. When you have completed the cluster, remove the packaged DBS samples from the Cluster Sample Bag (do not open the small ziplock bags).
3. One by one, check the barcodes on the labels on the filter paper cards against the barcodes affixed to the back side of the DBS Transmittal Sheet. For each DBS sample, put a check mark in the column labelled health investigator for each corresponding barcode 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 column labelled TOTAL COUNT OF BLOOD SAMPLES. 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).
4. The team's field supervisor will follow behind you, re-verify the samples, and sign his/her name in the FIELD TEAM SUPERVISOR row.
5. Periodically, a sample pick up person 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 DBS Transmittal Sheet. **The samples and transmittal sheet will be transported to the designated laboratories for logging in and storage within one week after collection.**

**Note: Separate transmittal sheet will to be used for children, and it has to be packed separately with children DBS.**

**Summary of the steps involved in collecting blood for random blood glucose testing and HIV, Hepatitis-B and Hepatitis-C testing:**

- Check the Biomarker Questionnaire for individuals eligible for testing.
- Seek voluntary consent for blood glucose testing and blood collection for HIV, Hepatitis-B and Hepatitis-C testing from the respondent (if the respondent is age 15-17 and unmarried seek voluntary consent from the parent/responsible adult and the respondent and children age 4-5 years seek consent from the parent/responsible adult).
- Place the barcode labels from a single row on the barcode sheet in the Biomarker Questionnaire, on a filter paper card, and on the DBS Transmittal Sheet.
- Check the boxes appropriate for additional testing.
- Clean and prick the respondent's finger with a lancet.
- In adults, wipe away the first drop of blood, use the second for blood glucose
- Test the blood glucose in the glucometer.
- Fill the pre-printed circles on the filter paper card with the third through seventh blood drops.
- For children, wipe away the first drop of blood and fill the two pre-printed circles on the filter paper card with the second and third blood drop
- Stop the bleeding at the prick site.
- Place the filter paper card in the drying box.
- Collect biohazardous waste.
- Inform the respondent of his/her glucose results and provide an informational brochure on blood glucose.
- Provide a written referral for follow-up medical attention for respondents found to be with random blood glucose levels  $\geq 200\text{mg/dL}$ .

## **CHAPTER 7: BIOHAZARDOUS WASTE DISPOSAL**

Any material coming in contact with blood or serum (lancets, glucose strips, alcohol swabs, gauze, and gloves) is considered to be biohazardous (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, Hepatitis C and HIV, among survey personnel and within the study community. Biohazardous waste has to be collected in special containers during the blood collection and testing, securely stored and transported, and safely disposed at the end of each day of fieldwork.

You will place all biohazardous waste in a sharps container (lancets) or a red biohazardous waste bag (all other biohazardous material). The sharps containers and the biohazardous waste bags can be securely closed for safe storage and transportation during the fieldwork.

Take the biohazardous waste to a nearby health facility that can dispose of the waste in an incinerator. The health facilities should employ standard procedures for biohazardous waste disposal.

### **UNIVERSAL PRECAUTIONS IN THE COLLECTION OF BLOOD SAMPLES**

Universal precautions, as defined by the U.S. Centers for Disease Control and Prevention (CDC), are a set of precautions designed to prevent transmission of the human immunodeficiency virus (HIV), the Hepatitis B virus (HBV), and other blood borne pathogens when providing first aid or health care.

Below are excerpts from two documents on universal precautions: 1) CDC's 'Perspectives in Disease Prevention and Health Promotion Update: Universal Precautions for Prevention of Transmission of Human Immunodeficiency Virus, Hepatitis B Virus, and Other Blood borne Pathogens in Health-Care Settings,'<sup>5</sup> and 2) OSHA's 'Occupational Exposure to Blood borne Pathogens—Precautions for Emergency Responders.'<sup>6</sup>

#### **UNIVERSAL BLOOD PRECAUTIONS (U. S. Centers for Disease Control and Prevention (CDC))**

In 1983, CDC published a document entitled Guideline for Isolation Precautions in Hospitals (1) that contained a section entitled Blood and Body Fluid Precautions. The recommendations in this section called for blood and body fluid precautions when a patient was known or suspected to be infected with blood borne pathogens. In August 1987, CDC published a document entitled Recommendations for Prevention of HIV Transmission in Health-Care Settings (2). In contrast to the 1983 document, the 1987 document recommended that blood and body fluid precautions be consistently used for all patients, regardless of their blood borne-infection status. This extension of blood and body fluid precautions to all patients is referred to as Universal Blood and Body Fluid Precautions or Universal Precautions. Under universal pre-cautions, blood and certain body fluids of all patients are considered potentially infectious for human immunodeficiency virus (HIV), Hepatitis B virus (HBV), and other blood borne pathogens.

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<sup>5</sup> Morbidity and Mortality Weekly Report 1988; 37(24):377-388.

<sup>6</sup> U.S. Department of Labor, Occupational Safety and Health Administration. 1998 (Revised) OSHA 3106.

Universal precautions are intended to prevent parenteral, mucous membrane, and non-intact skin exposures of health-care workers to blood borne pathogens. In addition, immunization with the HBV vaccine is recommended as an important adjunct to universal precautions for health-care workers who have exposure to blood.

Since the recommendations for universal precautions were published in August 1987, CDC and the US Food and Drug Administration (FDA) have received requests for clarification of the following issues: 1) body fluids to which universal precautions apply, 2) use of protective barriers, 3) use of gloves for phlebotomy, 4) selection of gloves for use while observing universal precautions, and 5) need for making changes in waste management programmes as a result of adopting universal precautions.

Universal precautions apply to blood and to other body fluids containing visible blood. Occupational transmission of HIV and HBV to health-care workers by blood is documented. Blood is the single most abundant source of HIV, HBV, and other blood borne pathogens in the occupational setting. Infection-control efforts for HIV, HBV, and other blood borne pathogens must focus on preventing exposure to blood and delivering HBV immunization.

Protective barriers reduce the risk of exposure of the health-care worker's skin or mucous membranes to potentially infective materials. For universal precautions, protective barriers reduce the risk of exposure to blood, body fluids containing visible blood, and other fluids to which universal precautions apply. Examples of protective barriers include gloves, gowns, masks, and protective eyewear. Gloves should reduce the incidence of contamination of hands, but they cannot prevent penetrating injuries due to needles or other sharp instruments. Masks and protective eyewear or face shields should reduce the incidence of contamination of mucous membranes of the mouth, nose, and eyes.

Universal precautions are intended to supplement, rather than replace, recommendations for routine infection control, such as hand washing and using gloves to prevent gross microbial contamination of hands. Because specifying the types of barriers needed for every possible clinical situation is impractical, some judgment must be exercised.

The risk of nosocomial transmission of HIV, HBV, and other blood borne pathogens can be minimized if health-care workers use the following general guidelines:

1. Take care to prevent injuries when using needles, scalpels, and other sharp instruments or devices; when handling sharp instruments after procedures; when cleaning used instruments; and when disposing of used needles. Do not recap used needles by hand; do not remove used needles from disposable syringes by hand; and do not bend, break, or otherwise manipulate used needles by hand. Place used disposable syringes and needles, scalpel blades, and other sharp items in puncture-resistant containers for disposal. Place puncture-resistant containers as close to the use area as is practical.
2. Use protective barriers to prevent exposure to blood, body fluids containing visible blood, and other fluids to which universal precautions apply. The type of protective

barrier(s) should be appropriate for the procedure being performed and the type of exposure anticipated.

3. Wash hands and other skin surfaces that are contaminated with blood or other body fluids immediately and thoroughly.

Gloves should reduce the incidence of blood contamination of hands during phlebotomy (drawing blood samples), but they cannot prevent penetrating injuries caused by needles or other sharp instruments. The likelihood of hand contamination with blood containing HIV, HBV, or other blood borne pathogens during phlebotomy depends on several factors: 1) the skill and technique of the health-care worker, 2) the frequency with which the health-care worker performs the procedure (other factors being equal, the cumulative risk of blood exposure is higher for a health-care worker who performs more procedures), 3) whether the procedure occurs in a routine or emergency situation (where blood contact may be more likely), and 4) the prevalence of infection with blood borne pathogens in the patient population. The likelihood of infection after skin exposure to blood containing HIV or HBV will depend on the concentration of virus (viral concentration is much higher for Hepatitis B than for HIV), the duration of contact, the presence of skin lesions on the hands of the health-care worker and, for HBV, the immune status of the health-care worker. Although not accurately quantified, the risk of HIV infection following intact-skin contact with infective blood is certainly much less than the 0.5% risk following percutaneous needle stick exposures (5). In universal precautions, all blood is assumed to be potentially infective for blood borne pathogens, but in certain settings (e.g., volunteer blood-donation centres) the prevalence of infection with some blood borne pathogens (e.g., HIV, HBV) is known to be very low. Some institutions have relaxed recommendations for using gloves for phlebotomy procedures by skilled phlebotomists in settings where the prevalence of blood borne pathogens is known to be very low.

Institutions that judge that routine gloving for all phlebotomies is not necessary should periodically re-evaluate their policy. Gloves should always be available to health-care workers who wish to use them for phlebotomy. In addition, the following general guidelines apply:

1. Use gloves for performing phlebotomy when the health-care worker has cuts, scratches, or other breaks in his or her skin.
2. Use gloves in situations where the health-care worker judges that hand contamination with blood may occur; for example, when performing phlebotomy on an uncooperative patient.
3. Use gloves for performing finger sticks on children.
4. Use gloves when persons are receiving training in phlebotomy.

*Selection of Gloves.* The Center for Devices and Radiological Health, FDA, has the responsibility of regulating the medical-glove industry. Medical gloves include those

marketed as sterile surgical gloves or non-sterile examination gloves made of vinyl or latex. General-purpose utility ('rubber') gloves are also used in the health-care setting, but they are not regulated by the FDA since they are not promoted for medical use. There are no reported differences in barrier effectiveness between intact latex and intact vinyl, which are used to manufacture gloves. Thus, the type of gloves selected should be appropriate for the task being performed. The following general guidelines are recommended:

1. Use sterile gloves for procedures involving contact with normally sterile areas of the body.
2. Use examination gloves for procedures involving contact with mucous membranes, unless otherwise indicated, and for other patient care or diagnostic procedures that do not require the use of sterile gloves.
3. Change gloves between patient contacts.
4. Do not wash or disinfect surgical or examination gloves for reuse. Washing with surfactants may cause wicking, i.e., the enhanced penetration of liquids through undetected holes in the gloves. Disinfecting agents may cause deterioration.
5. Use general-purpose utility gloves (e.g., rubber household gloves) for house-keeping chores involving potential blood contact and for instrument cleaning and decontamination procedures. Utility gloves may be decontaminated and reused but should be discarded if they are peeling, cracked, or discoloured, or if they have punctures, tears, or other evidence of deterioration.

## References

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## **STANDARD PRECAUTIONS AGAINST BLOOD BORNE PATHOGENS**

(U. S. Occupational Safety and Health Administration (OSHA))

Universal precautions are designed to protect health-care workers and patients from exposure to blood borne pathogens and other potentially infectious body substances. They are mandated by the United States Occupational Safety and Health Administration (OSHA) and include the following.

1. Wear personal protective equipment (aprons, gowns, gloves, goggles, face shields, masks, and CPR devices) when exposure to blood, blood droplets, and other body fluids is anticipated; these precautions are always mandated during invasive procedures.
2. Wear gloves when doing patient care if skin is cut, abraded, or chapped; when collecting or handling specimens or body fluids; cleaning specimen containers; or decontaminating. If you anticipate contact with mucous membranes, non-intact skin, GI or GU tract, or active bleeding wounds; or anticipate invasive procedures such as venipuncture or vascular access procedures, then universal precautions must be observed.
3. Gowns, aprons, scrubs, or lab coats must cover exposed skin areas when there is a potential for splashing blood or body fluids on clothing; however, this protection is not required for routine-care situations in which blood or body substances are not likely to be present. Perform all procedures in such a way such that splashing, spattering, or droplet formation is minimized.
4. Prevent injuries that can be caused by needles, scalpels, and other ‘sharps.’ Dispose of all these in puncture-resistant containers. Do not recap, bend, break by hand, or remove needles from disposable syringes. Tape ‘piggyback’ needle devices in place to prevent accidental dislodging.
5. Remove torn or punctured gloves promptly. Wash hands and other skin surfaces immediately and thoroughly if contaminated with blood or other body fluids.
6. Eating, drinking, applying cosmetics or lip balm, and handling contact lenses are not permitted in work areas where there is a reasonable likelihood of exposure to blood or other body substances.
7. Health-care workers should protect and always take care of themselves first. Presume that all patients have hepatitis B or HIV. In cases of suspected HIV or hepatitis B (HBV) exposure, identify, obtain consent, and test for exposure if the patient consents to testing. If the patient refuses consent or outcome is positive, the health-care worker must receive HIV-antibody testing immediately. Advise HIV-negative person who has been exposed to seek medical evaluation of any acute febrile illness within 12 weeks of exposure to HIV and to retest in 6 to 12 weeks and 6 months after exposure. Some institutions offer prophylactic drug therapy or hepatitis B vaccinations to their employees. If exposed or

injured, the healthcare worker must make the decision to accept drug therapy within a few hours of the incident.

8. The following are definitions of infection-control terminology:

**Blood borne pathogens:** Organisms that can be transmitted from one person to another by exposure to the infected person's blood. The major pathogens include hepatitis B virus, hepatitis C virus, human immunodeficiency virus (HIV; the AIDS virus), and treponemes that cause syphilis.

**Body substances:** Any fluids or solids that come out of or off of the human body. Examples include saliva, sputum, urine, feces, wound drainage, and all the fluids referred to as 'other potentially infectious materials' (see later).

**Exposure incident:** The contact of blood or other body substances with an employee's mucous membranes (eyes, mouth), non-intact skin (skin with cuts, abrasions, dermatitis, or other); or contact by piercing or puncturing mucous membranes or skin with a contaminated item.

**Regulated (infectious) waste:** Items caked or saturated with blood, or other potentially infectious materials; contaminated sharps; pathologic and microbiologic waste.

**Other potentially infectious materials (OPIM):** Body substances specifically designated by the CDC and OSHA that may transmit blood borne pathogens include semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, amniotic fluid, saliva in dental procedures, or any body substance that is visibly contaminated with blood, and all body substances in situations for which it is difficult or impossible to determine whether blood is present.



## APPENDIX 1: BIOMARKER TESTING CONSENT STATEMENTS

### CONSENT FOR BLOOD PRESSURE MEASUREMENT

I would like to measure your blood pressure. This will be done three times, with an interval of about five minutes between measurements. This is a harmless procedure. It is used to find out if a person has high blood pressure. If it is not treated, high blood pressure may eventually cause serious damage to the heart. The results of this blood pressure measurement will be given to you after the measurement process is completed. I will explain the meaning of your blood pressure numbers. If your blood pressure is high, we will suggest that you consult a health facility or doctor since we cannot provide any further testing or treatment during the survey. You can also decide at any time not to participate in the blood pressure measurement. The result will be kept strictly confidential and will not be shared with anyone other than members of our survey team.

Do you have any questions?

You can say yes to the test or you can say no. It is up to you to decide.

**Will you allow me to measure your blood pressure?**

### CONSENT FOR RANDOM BLOOD GLUCOSE TESTING

As part of this survey, we are also measuring the level of sugar in the blood. If it is not treated, a high level of blood sugar may increase the risk for heart disease and stroke. For the blood glucose testing, we will need a few drops of blood from a finger. The equipment used to take the blood is clean and completely safe. It has never been used before and will be thrown away after each test.

The blood will be tested for glucose immediately, and the result will be told to you right away. The result will be kept strictly confidential and will not be shared with anyone other than members of our survey team. The results of this blood glucose test will be given to you with an explanation of the meaning of your blood glucose numbers. If your blood glucose is high, we will suggest that you consult a health facility or doctor since we cannot provide any counselling, further testing or treatment during the survey.

Do you have any questions about the blood glucose measurement so far? If you have any questions about the procedure at any time, please ask me.

You can say yes or no to having your blood glucose measured now.

**Will you allow me to proceed to take your measurement?**

### CONSENT FOR DBS COLLECTION

As part of the survey we also are asking people all over the country to take a Hepatitis-B, Hepatitis-C Virus and HIV test. HIV is the virus that causes AIDS. AIDS is a very serious illness. The Hepatitis-B, Hepatitis-C and HIV test is being done to see how big the Hepatitis B, Hepatitis C and AIDS problem is in India.

For the Hepatitis-B, Hepatitis-C and HIV test, we need a few (more) drops of blood from a finger. The equipment used to take the blood is clean and completely safe. It has never been used before and will be thrown away after each test. No names will be attached so we will not be able to tell you the test results. No one else will be able to know your test results either. If you want to know whether you have Hepatitis-B, Hepatitis-C and HIV, I can provide you with a list of nearby facilities offering counselling and testing for Hepatitis-B, Hepatitis-C and HIV. Information regarding prevention of Hepatitis-B and care for Hepatitis will be given along with a referral letter to the nearest health care facility for diagnosis and treatment.

Do you have any questions?

You can say yes to the test, or you can say no. It is up to you to decide.

Will you take the Hepatitis-B, Hepatitis-C and HIV test?

Will you take the HIV test?

### CONSENT FOR ADDITIONAL TESTING

We ask you to allow (NAME OF AGENCY) to store part of your blood sample at the laboratory for additional tests or research. We are not certain about what additional tests might be done. The blood sample will not have any name or other data attached that could identify you. You do not have to agree. If you do not want the blood sample stored for additional testing, you can still participate in the tests in this survey.

**Will you allow us to keep your blood sample stored for additional testing?**

## APPENDIX 2: NFHS-6 BLOOD PRESSURE REFERRAL FORM

### National Family Health Survey (NFHS-6): Blood Pressure Referral Form

**(Blood Pressure Referral Form to be given when adult's systolic pressure is greater than 140 mmHg and/or diastolic pressure is greater than 90 mmHg)**

During NFHS-6 \_\_\_\_\_ (NAME)'s blood pressure was measured on \_\_\_\_/\_\_\_\_/\_\_\_\_.  
His/her systolic pressure was \_\_\_\_ and his/her diastolic pressure was \_\_\_\_\_ mm/Hg, which is elevated.

**THIS PERSON NEEDS MEDICAL ATTENTION FOR HIGH BLOOD PRESSURE IN A HEALTH FACILITY.**

Date \_\_\_\_\_ Signature \_\_\_\_\_

-----CUT HERE-----

### National Family Health Survey (NFHS-6): Blood Pressure Referral Form

**(Blood Pressure Referral Form to be given when adult's systolic pressure is greater than 180 mmHg and/or diastolic pressure is greater than 109 mmHg)**

During NFHS-6 \_\_\_\_\_ (NAME)'s blood pressure was measured on \_\_\_\_/\_\_\_\_/\_\_\_\_.  
\_\_\_\_\_. His/her systolic pressure was \_\_\_\_\_ and his/her diastolic pressure was \_\_\_\_\_ mm/Hg, which is **severely elevated**.

**THIS PERSON NEEDS MEDICAL ATTENTION FOR HIGH BLOOD PRESSURE IN A HEALTH FACILITY RIGHT AWAY.**

Date \_\_\_\_\_ Signature \_\_\_\_\_

### APPENDIX 3: NFHS-6 RANDOM BLOOD GLUCOSE REFERRAL FORM

#### **National Family Health Survey (NFHS-6): Blood Glucose Referral Form**

**(Blood Glucose Referral Form to be given when adult's random glucose level is greater than 200mg/dL)**

During NFHS-6 \_\_\_\_\_ (NAME)'s random blood glucose level was tested on \_\_\_\_/\_\_\_\_/\_\_\_\_.

His/her random blood glucose level was \_\_\_\_mg/dL, which is abnormally high.

**THIS PERSON NEEDS MEDICAL ATTENTION FOR HIGH BLOOD GLUCOSE IN A HEALTH FACILITY.**

Date \_\_\_\_\_ Signature \_\_\_\_\_

-----CUT HERE-----

#### **National Family Health Survey (NFHS-6): Blood Glucose Referral Form**

**(Blood Glucose Referral Form to be given when adult's random glucose level is greater than 200mg/dL)**

During NFHS-6 \_\_\_\_\_ (NAME)'s random blood glucose level was tested on \_\_\_\_/\_\_\_\_/\_\_\_\_.

His/her random blood glucose level was \_\_\_\_mg/dL, which is abnormally high.

**THIS PERSON NEEDS MEDICAL ATTENTION FOR HIGH BLOOD GLUCOSE IN A HEALTH FACILITY.**

Date \_\_\_\_\_ Signature \_\_\_\_\_

**APPENDIX 4 (A,B,C): REFERRAL CARD FOR FREE HIV, HEPATITIS-B AND  
HEPATITIS-C TESTING**

**APPENDIX 4A: REFERRAL TO HEALTH FACILITY**

**(LETTER NUMBER)**

Date: \_\_\_\_\_

To

**The Incharge**

(Treatment Site), *Address*

**Subject: Referral Letter for Hepatitis-B testing**

Dear **Sir/Madam**,

Presently the sixth National Family Health Survey (NFHS-6) is being conducted under the stewardship of the Ministry of Health and Family Welfare (MOHFW). The International Institute for Population Sciences (IIPS), Mumbai, is designated as nodal agency for coordinating the NFHS-6 project and **(ORGANIZATION)** is conducting the fieldwork for NFHS-6 in **(STATE)**.

As a part of this survey, health investigators visit sampled households in selected villages, towns and cities throughout India. During the survey, women and men and children age 4-5 in randomly selected household are asked to give a capillary blood sample from a fingerstick for **Hepatitis-B** testing in ICMR. The **Hepatitis-B** prevalence results from the tests will be used by the Ministry of Health and Family Welfare for further refining programme strategies.

The **Hepatitis-B** testing in NFHS-6 is anonymous, i.e., no individual identifiers are associated with the blood samples or test results and, therefore, respondents will not be provided with information about their own **Hepatitis-B** status. However, we are giving this referral letter to respondents to receive a **Hepatitis-B** test at a health facility, so that they will have an opportunity to receive **Hepatitis-B** testing at a health facility without charge if they desire.

**The bearer of this letter Ms./Mr. -----was eligible for anonymous Hepatitis-B testing in NFHS-6 and hence may please be provided with necessary services for voluntary counseling and testing for Hepatitis-B free of charge.**

**If you have any questions about the NFHS-6 survey, you may contact:**

**(ADD CONTACT INFORMATION FOR FIELD AGENCY CONDUCTING NFHS-6)**

Thanking you and with regards,

Yours sincerely,

**(In-charge of Organization)**

## APPENDIX 4B: REFERRAL TO HEALTH FACILITY

(**LETTER NUMBER**)

Date: \_\_\_\_\_

To

**The Incharge**

(Treatment Site), *Address*

**Subject: Referral Letter for Hepatitis-C testing**

Dear **Sir/Madam**,

Presently the sixth National Family Health Survey (NFHS-6) is being conducted under the stewardship of the Ministry of Health and Family Welfare (MOHFW). The International Institute for Population Sciences (IIPS), Mumbai, is designated as nodal agency for coordinating the NFHS-6 project and (**ORGANIZATION**) is conducting the fieldwork for NFHS-6 in (**STATE**).

As a part of this survey, health investigators visit sampled households in selected villages, towns and cities throughout India. During the survey, women and men from randomly selected households are asked to give a capillary blood sample from a fingerstick for Hepatitis-C testing in ICMR. The **Hepatitis-C** prevalence results from the tests will be used by the Ministry of Health and Family Welfare for further refining programme strategies.

The Hepatitis-C testing in NFHS-6 is anonymous, i.e., no individual identifiers are associated with the blood samples or test results and, therefore, respondents will not be provided with information about their own Hepatitis-C status. However, we are giving this referral letter to respondents to receive a **Hepatitis-C** test at a health facility, so that they will have an opportunity to receive **Hepatitis-C** testing at a health facility without charge if they desire.

**The bearer of this letter Ms./Mr. -----was eligible for anonymous Hepatitis-C testing in NFHS-6 and hence may please be provided with necessary services for voluntary counseling and testing for Hepatitis-C free of charge.**

**If you have any questions about the NFHS-6 survey, you may contact:**

**(ADD CONTACT INFORMATION FOR FIELD AGENCY CONDUCTING NFHS-6)**

Thanking you and with regards,

Yours sincerely,

**(In-charge of Organization)**

(Organization)

APPENDIX 4C: NFHS-6 HIV REFERRAL TO ICTC

(*LETTER NUMBER*)

Date: \_\_\_\_\_

To

**The Incharge**

Integrated Counselling and Testing Centre (ICTC), *Address*

**Subject: Referral Letter for Voluntary Counselling and Testing of HIV**

Dear Sir/Madam,

Presently the sixth National Family Health Survey (NFHS-6) is being conducted under the stewardship of the Ministry of Health and Family Welfare (MOHFW). The International Institute for Population Sciences (IIPS), Mumbai, is designated as nodal agency for coordinating the NFHS-6 project and (*ORGANIZATION*) is conducting the fieldwork for NFHS-6 in (*STATE*).

As a part of this survey, health investigators visit sampled households in selected villages, towns and cities throughout India. During the survey, women and men in randomly selected household are asked to give a capillary blood sample from a fingerstick for HIV testing in one of six reputed laboratories. The HIV prevalence results from the tests will be used by the National AIDS Control Organization (NACO) and the Ministry of Health and Family Welfare for further refining programme strategies.

The HIV testing in NFHS-6 is anonymous, i.e., no individual identifiers are associated with the blood samples or test results and, therefore, respondents will not be provided with information about their own HIV status. However, we are giving this referral letter to respondents to receive an HIV test at a health facility, so that they will have an opportunity to receive voluntary counselling and HIV testing at a health facility without charge if they desire.

**The bearer of this letter Ms/Mr -----was eligible for anonymous HIV testing in NFHS-6 and hence may please be provided with necessary services for voluntary counselling and testing for HIV free of charge.**

**If you have any questions about the NFHS-6 survey, you may contact:**

**(ADD CONTACT INFORMATION FOR FIELD AGENCY CONDUCTING NFHS-6)**

Thanking you and with regards,

Yours sincerely,

**(In-charge of Organization)**  
(Organization)

## APPENDIX 5: NFHS-6 BLOOD PRESSURE AND DIABETES BROCHURE FOR ADULTS

### What IS Diabetes?

Diabetes is a set of metabolic disorders characterized by **elevated blood glucose** levels due to defective insulin secretion and/or ineffective insulin action.

### What is MEASURED?

The level of glucose in blood is measured (usually on more than one occasion) to determine if the person has diabetes. The measurement is usually done on a **fasting blood sample**, about 8 to 12 hours after eating, or on a **random blood sample**.

### What CAUSES diabetes?

In most cases the cause of diabetes is not known. Some of the possible causes are:

- ◇ Poor diet
- ◇ Obesity
- ◇ Viral infection
- ◇ Age
- ◇ Stress
- ◇ Smoking
- ◇ Family history
- ◇ Genetics
- ◇ Lack of physical activity

### TEST RESULTS

Date \_\_\_\_\_

Woman/Man	Child 1	Child 2	Child 3
Height (cm)			
Weight (Kg)			
Name: _____			
BLOOD GLUCOSE (Random)			
mg/dL			
Blood glucose category			
	Normal	Abnormal	Referral
Random Blood glucose	≤ 200 mg/dL	> 200 mg/dL	Yes No
BLOOD PRESSURE			
SYSTOLIC		DIASTOLIC	
BLOOD PRESSURE CATEGORY	Systolic (mm Hg)	Diastolic (mm Hg)	Referral: Recheck within
Normal (Optimal)	<120	And <80	1 Year
Normal (Mildly high)	<130	And <85	1 Year
Normal (Moderately high)	130 - 139	And/Or 85 - 89	2 Months
Abnormal (Mildly elevated)	140 - 159	And/Or 90 - 99	1 Month
Abnormal (Moderately elevated)	160 - 179	And/Or 100 - 109	1 Week
Abnormal (Severely elevated)	≥180	And/Or ≥110	Immediately

Note!!! Your blood pressure was measured by a trained examiner. These measurements were obtained as part of a survey and do not represent a medical diagnosis. Interpretation of these measurements must be made by a physician.

### What IS Blood Pressure?

Arterial blood pressure is the force exerted by the blood on the walls of the arteries as the heart pumps (contracts) and relaxes.

Elevated high blood pressure is dangerous because it can lead to serious health problems such as kidney failure, and death from coronary heart disease and stroke.

### What is MEASURED?

The **systolic pressure** is the maximum pressure in an artery at the moment when the heart is beating and pumping blood through the body.

The **diastolic pressure** is the lowest pressure in an artery at the moments between beats when the heart is resting.

A person is considered to have high blood pressure (hypertension) if either one of the two pressures is above normal.

### What CAUSES high Blood Pressure?

The exact causes of high blood pressure are unknown, but several factors may play a role in its development including:

- ◇ Smoking
- ◇ Overweight / Obesity
- ◇ Lack of physical activity
- ◇ Family history
- ◇ Genetics
- ◇ High salt and/ or alcohol intake
- ◇ Older age
- ◇ Stress

### MEASURES OF PREVENTION.....

#### Can Diabetes be PREVENTED?

Diabetes can be prevented by:

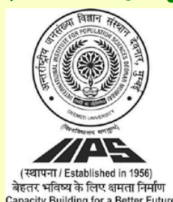
- ◇ Reducing carbohydrates in the diet
- ◇ Regular exercise

#### Can high Blood Pressure be PREVENTED?

High blood pressure can be prevented by:

- ◇ Reducing weight
- ◇ Increasing physical activity
- ◇ Increasing consumption of fruits and vegetables
- ◇ Reducing salt and alcohol consumption
- ◇ Stopping smoking

## Implementing Agency



INTERNATIONAL INSTITUTE FOR  
POPULATION SCIENCES (IIPS),  
Mumbai - 400088

## National Family Health Survey (NFHS-6)

Name \_\_\_\_\_ Date \_\_\_\_\_

International Institute for Population Sciences (IIPS) is conducting the National Family Health Survey in which testing of blood glucose and measuring of blood pressure are included. The study will help us identify whether there are problems with diabetes and hypertension among women and men in India.

We appreciate you allowing us to interview and test you.

Thank you for your cooperation.

*Please look inside  
for the results of your  
blood glucose and  
blood pressure tests.*



## APPENDIX 6: HEPATITIS-B AND HEPATITIS-C BROCHURE

### What is Hepatitis?

Hepatitis is a term used to describe inflammation (swelling) of the liver. It can be caused due to viral infection or when liver is exposed to harmful substances such as alcohol.

### What is Hepatitis B?

Hepatitis B is the liver disease that is caused by Hepatitis B virus. The virus attacks and damages the liver. This disease is common in India. Hepatitis B can be acute or chronic.

**Acute hepatitis B:** It is short term infection that occurs within the first 6 months after someone is infected with hepatitis B virus. Acute hepatitis B can be a mild illness with few or no symptoms at all or it can be a severe illness. Some people, particularly adults, are able to get rid of the virus from their bodies. Such people become immune and cannot get infected with Hepatitis B virus again. Some people who are not able to clear the virus from bodies, become chronic, life-long infected with Hepatitis-B virus.

**Chronic hepatitis B:** This is life-long infection with Hepatitis B virus. Whether a person infected develops a chronic infection largely depends upon the age at which the person gets infected. Up to 90% of infants infected with Hepatitis-B virus go on to develop a chronic infection. The risk rapidly decreases as the age at which infection occurs increases. Only 5% of adults who develop in to a chronic infection. Over time chronic Hepatitis B can causes serious liver damage, liver cirrhosis, liver cancer and death.

### What are the SYMPTOMS of Acute Hepatitis B?

- Abdominal pain
- Dark urine
- Fever
- Joint pain
- Loss of appetite
- Nausea and vomiting
- Weakness and fatigue
- Yellowing of your skin and the whites of your eyes (Jaundice)

### What are the SYMPTOMS of Acute Hepatitis B?

For long period of time, people with chronic Hepatitis B remain symptom free and do not feel ill. The symptoms, if they occur, may suggest advanced liver disease and are similar to acute Hepatitis B.

### How Hepatitis B is transmitted?

Hepatitis B is transmitted when blood, semen, and other body fluids from an infected person enters the body of other non-infected person. Many people who are infected catch the virus from their mother at the time of birth. Small children can be infected within households perhaps through skin sores, circumcision, piercing or scarification. Shared needles, syringes, drug preparation equipment and tattoos can transmit the virus. Direct contact with the blood or open sores of an infected person as well as sex with infected person can transmit the infection.

**Hepatitis B is not spread through:** Breastfeeding, coughing, sneezing, holding hands, sharing eating utensils, hugging, kissing, holding hands. Hepatitis B does not spread via contaminated food or water.

**Diagnosis:** The only way to know if someone is having Hepatitis B is to get tested.

### How Hepatitis C is transmitted?

The infection spreads when blood contaminated with the virus enters the bloodstream of an uninfected person.

Transmission can occur via-

- Blood transfusions and Organ transplant
- Birth
- Sharing needles, syringes and other equipment used in drug injection
- Sex with infected person, particularly among men having sex with men
- Non-sterile tattooing, body piercing
- Sharing personal items that may come contact with blood like razors, nail clippers, toothbrushes etc.

### Is Hepatitis C DANGEROUS?

Hepatitis C infection that continues over many years can cause significant complications, such as:

- Scarring of the liver (cirrhosis).
- Liver cancer
- Liver failure

### How can I Prevent Hepatitis C?

There is no vaccine to prevent Hepatitis-C. Protect yourself from hepatitis C infection by taking the following precautions:

- Stop using illicit drugs, particularly if you inject them. If you use illicit drugs, seek help. Avoid sharing needles and syringes.
- Avoid sharing personal items that may come in contact with blood.
- Be cautious about body piercing and tattooing from unlicensed shops. Make sure employees use sterile needles.

### Implementing Agency



(स्थापना / Established in 1956)  
वैद्युत भवन के लिए दमन निर्माण  
Capacity Building for a Better Future  
International Institute for Population Sciences (IIPS),  
Mumbai-400 088.

**Treatment:** One should contact doctor or nearest Treatment Site. Treatment are available that can slow down or prevent the effects of liver disease.

### How can I Prevent Hepatitis B?

Hepatitis B can be prevented. Vaccine is the best way to prevent Hepatitis B. The hepatitis B vaccine is typically given as three or four injections over six months.

The hepatitis B vaccine is recommended for newborns, children and adolescents not vaccinated at birth, people who live with someone who has hepatitis B, health workers, patients requiring repeated blood transfusions, intravenous drug users, people with high-risk sexual behaviour, men having sex with men, people with sexually transmitted disease, people with HIV, chronic liver disease, chronic kidney disease etc.

## National Family Health Survey (NFHS-6)

### What is Hepatitis C?

Hepatitis-C is liver disease caused by Hepatitis-C virus. The hepatitis C virus is a small, enveloped, positive-sense single-stranded RNA virus of the family Flaviviridae.

After infection people may have a very mild illness with no or few symptoms or a serious illness which may require hospitalization. For reasons not known, less than half of the people who get infected with Hepatitis-C virus are able to get rid of the virus within 6 months after infection. Whereas, most of the people who get infected will develop a chronic, lifelong infection. If not treated, chronic Hepatitis-C can result in severe liver damage, liver failure, liver cancer, and death.

### What are the SYMPTOMS of Hepatitis C?

Many people will not develop any symptom. If occur, the common symptoms are-

- Yellow discoloration of the skin and eyes (jaundice)
- Fatigue
- Poor appetite
- Nausea
- Fever
- Dark-colored urine
- Light-colored stool
- Joint pain
- Weight loss

The symptoms after chronic infection suggest advanced liver disease.

- Practice safer sex. Don't engage in unprotected sex with multiple partners or with any partner whose health status is uncertain. Sexual transmission between monogamous couples may occur, but the risk is low.
- If you are a health care or public safety worker, follow universal blood/body fluid precautions and safely handle needles and other sharps.

### Is there treatment for Hepatitis-C?

Treatments are available that can cure Hepatitis-C. Consult doctor or nearest Treatment Site for further information.

### Reference:

<https://www.nhp.gov.in/disease/digestive/liver/hepatitishttps://www.cdc.gov/hepatitis/hbv/pdfs/HepBGeneralFactSheet.pdf>  
<https://www.cdc.gov/hepatitis/hbv/pdfs/HepCGeneralFactSheet.pdf>

## APPENDIX 7: CALIBRATION LOG - MEASURING BOARDS

Month and Year:						
Equipment ID	Day of Month	Cluster Number	Measurement in cm	Condition/Remarks	Not in use (check)	Technician ID
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## APPENDIX 8: CALIBRATION LOG - WEIGHING SCALES

Month and Year:						
Equipment ID	Day of Month	Cluster Number	Measurement in kg	Condition/Remarks	Not in use (check)	Technician ID
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## APPENDIX 9: NFHS-6: DRIED BLOOD SPOT (DBS) TRANSMITTAL SHEET FOR ADULTS (FRONT)

KEEP IN LARGE ZIPLOC BAG WITH SAMPLES UNTIL FINAL SIGNATURE OBTAIN

<b>STATE</b>		<b>DISTRICT</b>		<b>PSU</b>							
<b>NAME:</b>		<b>NAME:</b>		<b>NAME:</b>							
<b>NUMBER:</b>		<b>NUMBER:</b>		<b>NUMBER:</b>							
HEALTH INVESTIGATOR CODE											
<table border="1" style="width: 100%; height: 20px;"> <tr> <td style="width: 20px;"></td> <td style="width: 20px;"></td> <td style="width: 20px;"></td> <td style="width: 20px;"></td> <td style="width: 20px;"></td> <td style="width: 20px;"></td> </tr> </table>											

PERSON SENDING /RECEIVING SAMPLES	TIME TO FILL IN FORM	TOTAL UNITS OF BLOOD SAMPLES	SIGNATURE CONFIRMING THAT EACH BLOOD SAMPLES IS PRESENT-SEE BACK OF FORM	SIGNATURE CONFIRMING THAT THE NUMBER OF BLOOD SAMPLES MATCHES COL.3	DATE	NOTES (NOTE ANY DISCREPANCY IN NUMBER OF SAMPLES)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)		
HEALTH INVESTIGATOR	WHEN CLUSTER IS COMPLETED	<table border="1" style="width: 40px; height: 20px;"> <tr> <td style="width: 20px;"></td> <td style="width: 20px;"></td> </tr> </table>						
FIELD TEAM SUPERVISOR	AFTER INVESTIGATOR HAS DONE HIS/HER COUNT	<table border="1" style="width: 40px; height: 20px;"> <tr> <td style="width: 20px;"></td> <td style="width: 20px;"></td> </tr> </table>						
SAMPLE PICK UP PERSON	WHEN SAMPLES ARE PICKED UP IN FIELD	<table border="1" style="width: 40px; height: 20px;"> <tr> <td style="width: 20px;"></td> <td style="width: 20px;"></td> </tr> </table>						
RECEIVER AT (LABORATORY)	UPON ARRIVAL AT (LABORATORY)	<table border="1" style="width: 40px; height: 20px;"> <tr> <td style="width: 20px;"></td> <td style="width: 20px;"></td> </tr> </table>						

**HEALTH INVESTIGATOR:** Upon completion of a cluster, verify that the barcode label on each blood sample (filter paper card) collected and stored in the large ziploc bag labeled with the cluster number corresponds to a barcode 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 ziploc bag.

**FIELD TEAM SUPERVISOR:** After the interviewer has verified the blood samples, you will conduct a second verification. Count the number of blood samples, record the total in Column (3). Verify that the barcode number on each blood sample (filter paper card) collected and stored in the large ziploc bag labeled with the cluster number corresponds to a barcode number pasted to the back of this transmittal sheet (and vice-versa) and sign Column (4). Verify that your count of blood samples is the same as the number reported by the interviewer and sign Column (5). Note any discrepancies in Column (7). Record the date in Column (6). Now scan the barcodes on the transmittal sheet into CAPI. Fold and store this transmittal sheet in the large ziploc bag.

**SAMPLE PICK UP PERSON:** Before leaving a cluster, you will verify the number of blood samples collected in the completed cluster. For the completed cluster, count and record in Column (3) the total number of blood samples stored in the large ziploc bag labeled with that cluster number. Note any discrepancies in Column (7). Sign your name in Column (5) and the date in Column (6). Fold and store this transmittal sheet in the large ziploc bag.

**RECEIVER AT [LABORATORY]:** Upon receiving blood samples from the project office, verify that the barcode number on each blood sample (filter paper card) collected and stored in the large ziploc bag labeled with the cluster number corresponds to a barcode 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 form and return the original to the project office.

**Note:** This form will be destroyed under the direction of the Laboratory Director after all blood samples have been completely processed and the final test results have been determined for each usable sample.

**NFHS-6: DBS TRANSMITTAL SHEET (BACK)**

NO.	SAMPLE BARCODE	HEALTH INVESTIGATOR	LAB
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**NFHS-6: DRIED BLOOD SPOT (DBS)**  
**TRANSMITTAL SHEET FOR CHILDREN (FRONT)**  
 KEEP IN LARGE ZIPLOC BAG WITH SAMPLES UNTIL FINAL SIGNATURE  
 OBTAINED

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<b>NAME:</b>	<b>NAME:</b>	<b>NAME:</b>								
<b>NUMBER:</b>	<b>NUMBER:</b>	<b>NUMBER:</b>								
<b>HEALTH INVESTIGATOR CODE</b>										
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PERSON SENDING /RECEIVING SAMPLES	TIME TO FILL IN FORM	TOTAL UNITS OF BLOOD SAMPLES	SIGNATURE CONFIRMING THAT EACH BLOOD SAMPLES IS PRESENT-SEE BACK OF FORM	SIGNATURE CONFIRMING THAT THE NUMBER OF BLOOD SAMPLES MATCHES COL.3	DATE	NOTES (NOTE ANY DISCREPANCY IN NUMBER OF SAMPLES)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
HEALTH INVESTIGATOR	WHEN CLUSTER IS COMPLETED	<div></div>				
FIELD TEAM SUPERVISOR	AFTER INVESTIGATOR HAS DONE HIS/HER COUNT	<div></div>				
SAMPLE PICK UP PERSON	WHEN SAMPLES ARE PICKED UP IN FIELD	<div></div>				
RECEIVER AT (LABORATORY)	UPON ARRIVAL AT (LABORATORY)	<div></div>				

**HEALTH INVESTIGATOR:** Upon completion of a cluster, verify that the barcode label on each blood sample (filter paper card) collected and stored in the large Ziploc bag labeled with the cluster number corresponds to a barcode 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 ziploc bag.

**FIELD TEAM SUPERVISOR:** After the interviewer has verified the blood samples, you will conduct a second verification. Count the number of blood samples, record the total in Column (3). Verify that the barcode number on each blood sample (filter paper card) collected and stored in the large ziploc bag labeled with the cluster number corresponds to a barcode number pasted to the back of this transmittal sheet (and vice-versa) and sign Column (4). Verify that your count of blood samples is the same as the number reported by the interviewer and sign Column (5). Note any discrepancies in Column (7). Record the date in Column (6). Now scan the barcodes on the transmittal sheet into CAPI. Fold and store this transmittal sheet in the large ziploc bag.

**SAMPLE PICK UP PERSON:** Before leaving a cluster, you will verify the number of blood samples collected in the completed cluster. For the completed cluster, count and record in Column (3) the total number of blood samples stored in the large ziploc bag labeled with that cluster number. Note any discrepancies in Column (7). Sign your name in Column (5) and the date in Column (6). Fold and store this transmittal sheet in the large ziploc bag.

**RECEIVER AT [LABORATORY]:** Upon receiving blood samples from the project office, verify that the barcode number on each blood sample (filter paper card) collected and stored in the large ziploc bag labeled with the cluster number corresponds to a barcode 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 form and return the original to the project office.

**Note: This form will be destroyed under the direction of the Laboratory Director after all blood samples have been completely processed and the final test results have been determined for each usable sample.**

**NFHS-6: DBS TRANSMITTAL SHEET (BACK)**

NO.	SAMPLE BARCODE	HEALTH INVESTIGATOR	LAB
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