THE FIRST SOUTH AFRICAN NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY (SANHANES-1)

Anthropometry

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Training Programme

**Base Measurements**

- Weight & height measurements of adults & children of various ages
- Practice weight & height measurements

**Circumferences**

- Hip and waist circumference
- Practice hip and waist circumference
- Head and upper arm circumference
- Practice head and upper arm circumference
- Practice and assessment of all circumferences
Training Programme

Skin Folds

• Biceps, triceps, sub-scapular and supra-iliac skinfold measurements
• Practice and assessment of all skinfold measurements
Practice makes Perfect

Questions answered here even the silly ones
## Day 1: Tuesday 6 March

<table>
<thead>
<tr>
<th>Time</th>
<th>Activities</th>
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<tbody>
<tr>
<td>08h00 – 10h00</td>
<td>Weight and height measurements of adults and children of various ages</td>
</tr>
<tr>
<td>10h15 – 13h00</td>
<td>Practice weight and height measurements Assessment Hip and waist circumference Practice hip and waist circumference</td>
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<tr>
<td>14h00 – 16h00</td>
<td>Head and upper arm circumference Practice head and upper arm circumference</td>
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<tr>
<td>16h15 – 17h30</td>
<td>Practice and assessment of all circumferences</td>
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<tr>
<td>Time</td>
<td>Activity</td>
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<td>10h15 – 13h00</td>
<td>Biceps, triceps, sub-scapular and supra-iliac skinfold measurements</td>
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<td>14h00 – 17h00</td>
<td>Practice and assessment of all skinfold measurements</td>
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</table>
Purpose of Anthropometrics

- Collect high quality body measurements
- Standardized methods
- Accurate data – trends over time (true differences)
- Used to track growth and weight trends
- Nutritional and health status (children/adults)
Purpose of Anthropometrics

- Pre-exam procedures
  - Prepare the room
  - Check all supplies
  - When participant enters room
    - Introduce yourself & recorder
    - Close curtain/door
    - Confirm the participant id
    - Briefly explain procedures
    - Explain “please remove your clothes and shoes and loosen your hair”
General Guidelines for measuring/recording

- Always tell the participant what you are going to do before you do it!
- Measure the right side of the body
- Turn the participant in the direction needed for a given measure
- Position the zero (0) end of the tape measure BELOW measurement value
- Avoid parallax
- Record all measurements to nearest 0.1cm (except skin folds)
- Latter to nearest 0.1mm
Ethical Issues in Anthropometry

Anthropometry

- technique assess presence & degree PEM
- measurement of body parameters - indicate nutritional status.
- measure an individual to determine if he or she needs nutrition intervention
- measure many individuals to determine if malnutrition is a problem in a population.
Ethical Issues in Anthropometry

- Act professional and confident
- Explain in detail what will be expected from participant
- Make sure they understand (repeat if needed!)
- Explain personal space and private space
- Read participant’s body language
- Respect culture and religion
- Do not make jokes (or laugh) about body shapes!
- Step back when they indicate they wish not to take part!
- Refer all cases to PI’s!
Routine Checks

- Once the Clinic Assistant receives the envelope from the Clinic Administrator,
  - checks that the right participant is being seen
  - asking the participant their name and checking that it is the same as the name listed on the clinical examination form and appointment card.
- The Clinic Assistant then checks that the details of the participant are fully completed in the form and that the unique barcode appears on the form.
- The Clinic Assistant then removes the clinical examination form, records and writes her name, staff number and the starting time on the form.
Morning Session: 6 March 2012

Social science that makes a difference
Base Measurements

Weight

Who will be measured?

• Everyone

Equipment

• Adult scale

• Paediatric scale

Equipment calibration

• Total weight = 80kg
Weighing

• Make sure scale is calibrated!
• Switch on
• Zero indicator + stable indicator

• Weigh participants after voiding (NO shoes!)
• Minimum clothing
  • Young children – dry nappies
  • Older children – under clothes
  • Adolescents/Adults – exam gown
• Paediatric scales
  • 0-24 months
Scale Calibration

Why so important?

- ensure that a weight scale is accurate.
- calibration may be necessary every few weeks/or months, to confirm that the scales are still weighing accurately
- Scales begin to show inaccurate weights for a variety of reasons.
  - components of the scale become worn out
  - environmental factors can play a role as well.
  - many scales do not perform well in temperature
  - the more likely it is that inaccuracies will arise.
Scale Calibration

- perform scale calibration - use a known weight to see if the scale returns the correct measurement.
- To calibrate the scale, the weight is set on the scale and the reading is noted.
- Next, the scale can be adjusted until it yields a correct weight measurement.
Weighing

Procedure

• Step or place on scale
• Standing/sitting/lying still
• Upright in middle of platform
• Face forward
• Feet flat and slightly apart
• Take reading in kg’s (to nearest 100g) (clinic assistant) on examination form
• Step off/removed from scale
• Zero then repeat
• Two readings – not vary by more than 100g
• Larger than 200kg – no measurement
### Data Entering

**Section G to be completed by the fieldworker**

<table>
<thead>
<tr>
<th>Clinic Fieldworker</th>
<th>Start time</th>
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</tbody>
</table>

#### SECTION G

**Anthropometry**

<table>
<thead>
<tr>
<th>Measurement type</th>
<th>Unit</th>
<th>Recorded measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (all participants)</td>
<td>kg</td>
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1. Unable to obtain a measurement
Height/Length

Who will be measured?
- Everyone

Equipment
- Infantometer/measuring board (children < 3yrs)
- Stadiometer (participants > 3yrs)
Children < 3yrs

- Supine length
- Even + uncarpeted area
Procedure: Children < 3yrs

- Place child on board – on back
- Head touching head board and shoulders touching the base of board
- Hold child in position
- Heels touch board
- Legs straight
- Slide foot board
- Read inside aspect of board to nearest 0.1cm
Heels against footboard
shoulders touching baseboard
Crown of head touching headboard.
Head in Frankfurt plane.
Procedure: Participants > 3yrs
- Standing height
- Remove shoes
- Release tied-up hair

Positioning:
- Place head in Frankfort plane
- Relaxed arms and shoulders
- Shoulders, buttocks, heels
- Straight legs & knees
- Feet flat & together
Measurer's eyes level with headboard.

Headboard flat against the wall and resting on crown of head. Head in the Frankfort plane.

Head, shoulder blades, and buttocks against the wall.

Shoulders relaxed, arms at sides.

Feet bare, flat on floor. Heels close together and against the wall.
Units

Repeated measures

Social science that makes a difference
Circumferences

Who will be measured?

• All participants ≥ 3 months

What circumferences will be measured?

• Mid-upper arm
• Head
• Waist
• Hip

Equipment

• Non-stretch tape measure
Circumferences: Mid-Upper Arm

Location of mid-upper arm landmark

- Left lateral upper arm
- Arm flexed in 90°
- Midway between border of acromion and olecranon
Circumferences: MUAC

- Remove sleeved garments

Positioning:
- Head in Frankfort plane (stand erect)
- Relaxed arms
- Palms facing inward
- Wrap tape measure around midpoint (touching skin and not too tight!)
- Take measurement at mid-point of upper-arm to nearest 0.1cm
- Repeat measurements if not within 0.1cm
Circumferences: Head

Who will be measured?
- All participants birth to 36 months

Equipment
- Non-stretch tape measure
Circumferences: Head

Location of Head Circumference landmarks
- Above supra-orbital ridge
- Occiput at back of skull
- Ensure head in Frankfort plane
Circumferences: Head

Procedure: Participants > 3yrs
- Release tied-up hair

Positioning:
- Feet flat & together
- Place head in Frankfort plane

Measurement
- Place tape measure around head at fixed landmarks
- Tighten the tape
- Read to nearest 0.1cm
- Repeat measurement
Circumferences: Waist

Who will be measured?
- All participants >3 months

Equipment
- Non-stretch tape measure
- Eye liner

Social science that makes a difference
Circumferences: Waist

Location of Waist Circumference landmarks

- **2 Sites**
  - Natural waist line
  - Umbilicus (naval)

Obese

Social science that makes a difference
Circumferences: Waist

Landmarks:

- Lowest rib (10th rib)
- Iliac crest
Circumferences: Waist

Procedure:

• Stand erect, abdomen relaxed, arms at sides, feet together, weight distributed evenly
• Locate lowest rib (10th) and mark with pen
• Locate iliac crest - on mid axillary line marked
• Define mid-point between 10th rib and iliac crest
• Breath normally
• Ensure tape is not compressed too tightly!
• Take measurement to nearest 0.1cm
• Repeat measurement
Circumferences: Waist

In healthy-weight people, some fat is stored around the organs of the abdomen.

In overweight people, excess abdominal fat increases the risks of heart disease, stroke, diabetes, hypertension, gallstones, insulin resistance and some types of cancer.

Upper-body fat is more common in men than in women and is closely associated with heart disease, stroke, diabetes, hypertension and some types of cancer.

Lower-body fat is more common in women than in men and is not usually associated with chronic diseases.

>102cm

>88cm

Central obesity

Social science that makes a difference
Circumferences: Hip

Who will be measured?
- All participants >3 months

Equipment
- Non-stretch tape measure
- Eye liner
Circumferences: Hip

Location of Hip Circumference landmark

- Maximum circumference over buttocks
Circumferences: Hip

Procedure:

- Stand erect, arms at sides, feet together, weight distributed evenly
- Locate point yielding largest circumference
- Place tape horizontally
- Ensure tape is not compressed too tightly!
- Take measurement to nearest 0.1cm
- Repeat measurement
Skin folds

- Used to estimate size of subcutaneous fat
- Total storage fat in body
Skin folds

Who will be measured?
- All participants >3 months
- *Children*: ≥ 3 months
  - Triceps, subscapular
- *Adults*: ≥18 yrs
  - All 4 sites

What skin folds will be measured?
- Biceps
- Triceps
- Sub Scapular
- Supra Iliac (iliac crest)

Equipment
- Harpenden Calliper
- Eye liner
Skin folds

Measuring Technique

- **Right side measurement for ALL skin folds!**
- Caliper measure compressed double fold fat + skin
- Parallel fold
**Skin folds**

**Measuring Technique**
- Grasp skin fold at marked site
- Index finger and thumb
- Hold skin all the time!
- Open caliper
- Place caliper in parallel
- Release caliper grip
- Read within 2-3s
- Grasp caliper grip
- Open and release skin
Skin fold: Biceps

Procedure:

• Stand erect, arms at sides hanging freely, shoulders relaxed, feet together, weight distributed evenly.
• Locate same point as MUAC.
• Mark with.
• With relaxed arm take measurement.
• Repeat measurement.
Skin fold: Triceps

Procedure:

- Stand erect, arms at sides hanging freely, shoulders relaxed, feet together, weight distributed evenly
- Locate same point as MUAC
- Mark with
- With relaxed arm take measurement
- Repeat measurement
Skin fold: Triceps

Procedure:

- Stand erect, arms at sides hanging freely, shoulders relaxed, feet together, weight distributed evenly.
- Locate same point as MUAC.
- Mark with +.
- With relaxed arm grasp vertical skin fold + fat 2cm above marked midpoint.
- Repeat measurement.
Skin fold: Sub-Scapular

Procedure:
- Stand erect, arms at sides hanging freely, shoulders relaxed, feet together, weight distributed evenly
- Locate medial with fingers
- Run down until inferior angle
- 45° angle
- With relaxed arm take measurement
- Repeat measurement
Skin fold: Sub-Scapular

Inferior angle

45° Angle

Social science that makes a difference
Skin fold: Supra-iliac

Procedure:

- Stand erect, arms at sides hanging freely, shoulders relaxed, feet together, weight distributed evenly
- Locate mid-axillary line
- Superior to iliac crest
- Pick up skin fold obliquely posterior to mid-axillary line
- Skin is also contoured here
- Pick the skin up in natural contour
- With relaxed arm take measurement
- Repeat measurement
Skin fold: Supra-iliac