
Anthropometric Procedures

Set by National Center for Health Statistics (NCHS)

Center for Disease Control and Prevention

National Health and Nutrition Examination Survey III (NHANES III) is one survey of NCHS. NHANES III is to provide reference health and nutritional status data for the US population, and detailed statistics representing non-Hispanic whites, non-Hispanic blacks and Mexican Americans persons in all 50 states. Its mission is the collection and dissemination of health statistics for the nation. Collecting data using standardized procedures consistently allows for the comparison of locally collected data with nationally collected data.

Skinfold Measurements - General information

- Two to three measurements are usually taken and averaged.
- Mark bony landmarks or midpoints prior to measurement.
- Lift skin ~ 2cm or $\frac{3}{4}$ inch above the point at which the caliper tips will be placed.
- Using thumb and index finger separate the subcutaneous fat from the underlying muscle. Just enough skin and adipose tissue are taken up to form a distinct fold.
- The jaws of the calipers are placed perpendicular to the length of the fold while the technician continues to hold the skinfold.
- The measurement is read 3 seconds after the caliper tips are applied to the skin and the tension released from the caliper handle.
- Measurements are in mm to the nearest $\frac{1}{2}$ mm.

*If the fat cannot be separated from the muscle, make a note in the record, but do not record a value.

Clothing worn

Infants: clean diapers

Adults and children: paper gown and pants, foam slippers, and underpants

Upper Arm Length

To locate middle of the upper arm, subject stands with:

1. Right arm flexed 90 degrees at the elbow
2. Palm faces up
3. Fingertips point straight ahead
4. Technician stands behind subject.
Find the uppermost edge of the posterior border of the acromion process located on the right scapula. Make a horizontal mark.
5. Place the zero end of a steel measuring tape on this mark and extend the tape down the midline on the posterior surface of the arm to the tip of the olecranon process at the elbow.
6. Divide the distance between these two marks by 2, and make a horizontal mark at that point on the posterior aspect of the arm before removing the tape measure.
7. Cross this mark with another mark that lies in a plane extending from the acromion to the olecranon. This is the point that defines where the MAC and TSF will be taken.

Mid-Arm Circumference

1. Subject is standing, arms hanging loose, and relaxed. Muscle relaxed, not flexed or tightened.
 2. Technician stands to the right of subject.
 3. Place steel measuring tape around upper arm, perpendicular to the long axis of the arm at marked point.
 4. Hold tape gently on the skin surface, the two ends of the overlapping tape are pulled together. Do not compress the skin or underlying tissue.
 5. Record measurement to nearest mm.
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Triceps

1. Measure right upper arm at MAC.
2. Subject standing with feet together, arms and shoulders loose and relaxed at sides.
3. Technician stands behind subject and gently lifts tricep skinfold with fingertips centered just above mark.
4. The TSF is held parallel to the long axis of the upper arm.
Place tip of calipers jaws perpendicular to the length of the fold, 2 cm from fingertip and centered over the marked point.
5. Record to nearest 1/2 mm.

Subscapular

1. Subject is standing. Technician stands behind subject.
2. Shoulders relaxed, arms hanging loose at side.
3. Find the inferior angle of the right scapular - lower most tip of triangle-mark an X.
4. Using index finger (on top) and thumb, grasp directly above and medial to the X-about 2 cm (3/4"), with thumb reaching towards the spine. Note: skinfold forms a line diagonal towards the right elbow.
5. Jaws of caliper are placed perpendicular to the length of the fold and 2 cm from fingertips. Top jaw of caliper will be placed on the X.
6. Hold for 3 seconds then record measurement.
7. Record to the nearest 1/2 mm.
8. Release skinfold and repeat.
9. Take the average of 2 or 3 measurements.

Buttocks/Hip Circumference

1. Only measurement not taken on the skin (2 technicians preferred) Subjects stands with feet together (helps show protuberance of the area when viewed in profile).
2. One technician standing in front of subject gathers fabric of pants to minimize amount of material in measurement. Gather pants fabric in front at thighs.
3. Other technician to stand to the right side of subject-eye level at hip region.
4. Place tape measure over largest part-make sure both sides of the tape measure are horizontal, tighten, but do not compress the skin.
5. Measurement in cm to the nearest mm.

Waist/Abdominal Circumference

1. Subject standing with arms held slightly away from the body.
2. Technician stands on right side of person. Palpate upper hipbone to locate the right ilium.
3. Make a horizontal mark just above the upper most lateral border of the right ilium
4. Cross this line with a vertical line mark on the mid axillary line.
5. Tape measure is placed on mark, on a level, horizontal plane.
6. Tighten tape without compressing the skin.
7. Measure in cm to the nearest mm.

Umbilicus (Not part of the NHANES III procedures)

Stand to the side of the subject.

With breath at rest, take measurement at umbilicus, making sure tape is parallel to the floor.

Upper Leg Length & Thigh Midpoint

1. Subject sits on measuring table; the lower part of the right leg hangs freely over the edge of table.
2. The knee is positioned at 90 degree.

[Taken from NHANES III Anthropometric Procedures Video from the National Center for Health Statistics.](#)

For more information or to sign up for a nutrition class call:

Janelle L'Heureux MS RD: 213-201-1556 jheureux@apla.org or go to www.apla.org & click on Calendar. APLA copyright © 2006. For persons with disabilities, reasonable accommodation may be provided upon request. Please call 213-201-1582 TTY (for voice, call California Relay Service first at 711, then give operator the TTY number) at least 5 working days in advance to ensure availability.

3. Place the edges of a small sliding caliper firmly against the distal end of femur, on both sides of patella, as one would measure the breadth of patella.
4. The horizontal bar of the caliper should be touching the anterior surface of the thigh.
5. Draw a line at the lower border of the horizontal bar of caliper, proximal to patella.
6. The zero end of a steel measuring tape is placed at the inguinal crease, just below the anterior superior iliac spine.
7. The measuring tape is extended along the anterior midline of the thigh to the mark that was previously made just proximal to the patella.

To check for proper location of the zero end, the technician should firmly place the middle finger over the measuring tape at the site, and instruct the subject to raise the thigh slightly. If positioned correctly, a tightening of the muscle tendon will be clearly felt.

8. Record length to nearest mm.
9. To find midpoint, divide length by 2. Mark midpoint before removing measuring tape.

Thigh Circumference

1. Done on the skin.
2. Subject steps back with left foot. This shifts body weight to the left leg.
3. Right leg is in front and bent slightly at the knee.
4. Soles of both feet flat on the floor.
5. The right forward foot is used mainly to assist with balance, but should not bear the weight of the body.
6. Technician stands at right side, and places measuring tape around thigh at midpoint previously marked for upper leg length.
7. Tape measure is positioned on skin perpendicular to the long axis of the thigh.
8. The 2 ends of the overlapping tape are pulled together, careful not to compress skin or underlying subcutaneous fat.
9. Record in cm to the nearest mm

Weight

1. Void bladder
2. Subject wears paper gown and pants, slippers and underpants.
3. Measure 2 times. Repeat if difference greater than ¼ pound.

Height

1. Remove hairpieces, ornaments, cornrolls, braids, shoes, etc.
2. Stand with back to backboard of stadiometer.
3. Eyes looking straight ahead, arms at side, shoulders relaxed.
4. Heels together, touching back of board, toes pointed out ~ 60 degrees.

Try to make contact with the backboard and the following body points:

- Heels
- Buttocks
- Scapulas (shoulder blades)
- Back of head

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5. Head tilted so the Frankfort Plane (line from the lower orbital of the eye to the ear canal) is parallel to the floor and perpendicular to the backboard.
6. Move headboard down close to head.
7. Subject to take a deep breath and stand as tall as possible.
8. Move headboard down until it rests on the skull, not just on the hair.
9. Read in centimeters and record to nearest mm.

Resources For Assessment Tools

Calipers Fitness Wholesale Creative Health Products, Inc Caliper Calibration Block	(888) 396-7337 (800) 742-4478	http://www.fwonline.com/ http://www.chponline.com/ http://www.chponline.com/CHPStore.asp?WC=I=wciProduct&WCE=38
NHANES III Anthropometric Procedures Video Product # 017-022-01335-5, Order Online: "017-022-01335-5" (Include quotes and dashes) For fast delivery & specify mail service Link to NHANES anthropometric procedures manual. (PDF) Complete with pictures. NHANES Skinfold & Circumference Tables	(202) 512-1800 (866) 512-1800 (301) 458-4636	http://www.cdc.gov/nchs/about/major/nhanes/avideo.htm http://bookstore.gpo.gov http://www.cdc.gov/nchs/data/nhanes/nhanes_03_04/BM.pdf http://www.cdc.gov/nchs/products/pubs/pubd/series/sr11/240-221/240-221.htm http://www.cdc.gov/search.do?action=search&queryText=NHANES+skinfold+Tables&x=15&y=6 http://www.cdc.gov/nchs/data/ad/ad361.pdf
Stadiometers Quick Medical Healthscales Med-Electronics	(888) 345-4858 (800) 451-3890 (888) 321-1300	http://stadiometer.com/ http://www.healthscales.com http://www.med-electronics.com/emed/itmidx14.htm
Steel Measuring Tape Gulick II: Cost: \$35.00	(608) 735-4718	http://www.fitnessmart.com/fitshopr/products/67020.htm

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