

If the person taking skinfold measurements is inexperienced, it may be helpful to mark the correct sites with a marking pen.



(a) Triceps

(b) Biceps

(c) Subscapular

(d) Iliac Crest

(e) Medial Calf

- (a) *Triceps*. Pinch a vertical skinfold on the back of the right arm midway between the shoulder and elbow. To locate the site, place the forearm at 90° with the palm facing up. Locate the site and straighten the arm to 180° before measuring.
 - (b) *Biceps*. On the front of the arm at the same level as the triceps measurement, pinch a vertical fold along the midline of the front of the arm. The arm should be at the side of the body with the palm facing forward.
 - (c) *Subscapular*. Pinch a 45° angle fold along the inferior angle of the scapula. Shoulders should be relaxed with the arms by the sides.
 - (d) *Iliac Crest*. At a site approximately 3 cm above the crest of the ilium, pinch a forward, yet slightly downward fold. The arm of the skinfold side should be raised (such that the upper arm is parallel to the floor) with the hand placed on the same-side shoulder.
 - (e) *Medial Calf*. The relaxed skinfold foot should be placed on a step with the knee at a 90° angle. Pinch a vertical fold on the medial (inside) calf at the level of the maximum calf girth.
2. *Measuring the appropriate skinfolds*. Pinch a fold of skin between your thumb and forefinger. Pull the fold up so that no muscular tissue is included; don't pinch the skinfold too hard. Hold the calipers perpendicular to the fold and measure the skinfold about 1.0 cm away from your fingers. Allow the tips of the calipers to close on the skinfold and let the reading settle before marking it down. Take two readings at each site with readings measured to the nearest half-millimetre. Measure all five skinfolds before repeating measurements. If the difference between the first two measurements at one site is greater than 0.4 mm, a third measurement is taken. When two measurements are taken, use the average of those two as your final value. When three measurements are taken, the median value is the final value.
 3. *Record your measurements*. Record your individual scores and final values in the chart below. Indicate your scores for the sum of skinfold measurements (SO5S) in the chart in the *Assessing Your Health Risk* section of this lab.

| Site: | #1 | #2 | #3 | Average/Median |
|-------------|----|----|----|----------------|
| Triceps | | | | |
| Biceps | | | | |
| Subscapular | | | | |
| Iliac Crest | | | | |
| Medial Calf | | | | |

Waist Circumference and Waist-to-Hip Ratio

Equipment

1. Tape measure
2. Partner to take measurements

Preparation

Wear clothes that will not add significantly to your measurements.

Instructions

Stand with your feet together and your arms at your sides. Raise your arms only high enough to allow for taking the measurements. Your partner should make sure the tape is horizontal around the entire circumference and pulled snugly against your skin. The tape shouldn't be pulled so tight that it causes indentations in your skin. Record measurements to the nearest 0.5 cm.

Waist. Measure just above the superior (top) aspect of the iliac crest. To find your iliac crest, feel for the top edge of the suprailium (see Skinfold Measurement below).

See Table 6.1 for a reference to risk associated with your waist-hip-ratio score.

Record your measurement in the chart in the *Assessing Your Health Risk* section

Assessing Your Health Risk

Measurements

Sum of 5 skinfolds (SO5S) _____ mm

Waist circumference: _____ mm

Use the charts on the following pages (one for males and one for females) to calculate your health risk based on body composition scores.

- Start by figuring out which ROW you will score from by comparing your BMI score.
- Move across that row and determine the points your WC converts to—WCP.
- Continue across that row to discover the SO5S points—SO5SP.
- Place these numbers in the formula below to arrive at a Health Benefit Score.

$$\text{Health Benefit Score} = \frac{(\text{WCP} \times 1.5) + \text{SO5SP}}{2.5}$$

- Use your Health Benefit Score to gather a Health Benefit Rating and Health Benefit Zone from the following chart:

Scoring of Body Composition: Males

| BMI (kg/m ²) | Points Column A | WC (cm) | Points Column B | SO5S (mm) | Points Column C |
|-----------------------------|-----------------|------------|-----------------|--------------|-----------------|
| 18.5 | 3 | All girths | 3 | 25 | 3 |
| | | | | 25–54 | 4 |
| | | | | 55–79 | 3 |
| | | | | >79 | 2 |
| 18.5–24.9 | 4 | <94 | 4 | <54 | 4 |
| | | 94–101 | 2 | 54–77 | 3 |
| | | >101 | 0 | >77 | 2 |
| 25–29.9 | 3 | <94 | 4 | <54 | 4 |
| | | 94–101 | 3 | 54–77 | 3 |
| | | <101 | 1 | >77 | 2 |
| 30.0–32.4 | 2 | <94 | 4 | <54 | 4 |
| | | 94–101 | 2 | 54–77 | 3 |
| | | >101 | 0 | >77 | 2 |

continued

| BMI (kg/m ²) | Points Column A | WC (cm) | Points Column B | SO5S (mm) | Points Column C |
|-----------------------------|-----------------|------------|-----------------|--------------|-----------------|
| 32.5–35.0 | 1 | <94 | 4 | <54 | 4 |
| | | 94–101 | 2 | 54–77 | 2 |
| | | >101 | 0 | >77 | 0 |
| >35.0 | 0 | <94 | 4 | <54 | 4 |
| | | 94–101 | 2 | 54–77 | 2 |
| | | >101 | 0 | >77 | 0 |

SOURCE: *Canadian Physical Activity, Fitness & Lifestyle Approach: CSEP—Health & Fitness Program's Appraisal and Counselling Strategy*, 3rd edition. © 2003. Reprinted with permission from the Canadian Society for Exercise Physiology.

Scoring of Body Composition: Females

| BMI (kg/m ²) | Points Column A | WC (cm) | Points Column B | SO5S (mm) | Points Column C |
|-----------------------------|-----------------|------------|-----------------|--------------|-----------------|
| <18 | 3 | All girths | 3 | <46 | 3 |
| | | | | 46–83 | 4 |
| | | | | 84–113 | 3 |
| | | | | >113 | 2 |
| 18.5–24.9 | 4 | <80 | 4 | <83 | 4 |
| | | 80–87 | 3 | 83–113 | 3 |
| | | >87 | 1 | >113 | 2 |
| 25.0–29.9 | 3 | <80 | 4 | <83 | 4 |
| | | 80–87 | 3 | 83–113 | 3 |
| | | >87 | 1 | >113 | 2 |
| 30.0–32.4 | 2 | <80 | 4 | <83 | 4 |
| | | 80–87 | 2 | 83–113 | 3 |
| | | >87 | 0 | >113 | 2 |
| 32.5–35.0 | 1 | <80 | 4 | <83 | 4 |
| | | 80–87 | 2 | 83–113 | 2 |
| | | >87 | 0 | <83 | 1 |
| >35.0 | 0 | <80 | 4 | <83 | 4 |
| | | 80–87 | 2 | 83–113 | 2 |
| | | >87 | 0 | >113 | 0 |

SOURCE: *Canadian Physical Activity, Fitness & Lifestyle Approach: CSEP—Health & Fitness Program's Appraisal and Counselling Strategy*, 3rd edition. © 2003. Reprinted with permission from the Canadian Society for Exercise Physiology.

Conversion Between Health Benefit Ratings and Scores

| Health Benefit Rating | Symbol | Score |
|-----------------------|--------|-------|
| Excellent | E | 4 |
| Very Good | VG | 3 |
| Good | G | 2 |
| Fair | F | 1 |
| Needs Improvement | NI | 0 |

| Health Benefit Zone | |
|---------------------|---|
| Excellent | Your body composition falls within a range that is generally associated with optimal health benefits. |
| Very good | Your body composition falls within a range that is generally associated with considerable health benefits. |
| Good | Your body composition falls within a range that is generally associated with many health benefits. |
| Fair | Your body composition falls within a range that is generally associated with some health risk. <i>Continuing to progress from here into the GOOD zone will further increase the health benefits associated with your body composition.</i> |
| Needs Improvement | Your body composition falls within a range that is generally associated with considerable health risk. <i>Try to achieve and maintain a healthy body composition by enjoying regular physical activity and healthy eating. Progressing from here into the FAIR zone is a very significant step to increasing the health benefits associated with your body composition.</i> |

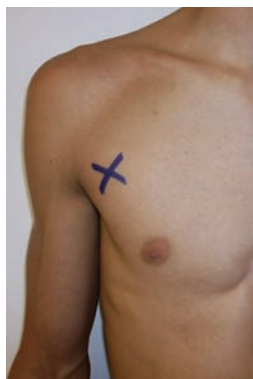
SOURCE: *Canadian Physical Activity, Fitness & Lifestyle Approach: CSEP—Health & Fitness Program's Appraisal and Counselling Strategy*, 3rd edition. © 2003. Reprinted with permission from the Canadian Society for Exercise Physiology.

Skinfold Measurements—Estimated Body Fat Percentage**Equipment**

1. Skinfold calipers
2. Partner to take measurements
3. Marking pen (optional)

Instructions

1. Select and locate the correct sites for measurement. All measurements should be taken on the right side of the body with the subject standing. Skinfolds are normally measured on the natural fold line of the skin, either vertically or at a slight angle. The skinfold measurement sites for males are chest, abdomen, and thigh; for females, triceps, suprailium, and thigh. If the person taking skinfold measurements is inexperienced, it may be helpful to mark the correct sites with a marking pen.



(a) Chest



(b) Abdomen



(c) Thigh



(d) Triceps



(e) Suprailium

- (a) *Chest*. Pinch a diagonal fold halfway between the nipple and the shoulder crease.
 - (b) *Abdomen*. Pinch a vertical fold about 2 cm to the right of the umbilicus (navel).
 - (c) *Thigh*. Pinch a vertical fold midway between the top of the hipbone and the kneecap.
 - (d) *Triceps*. Pinch a vertical skinfold on the back of the right arm midway between the shoulder and elbow. The arm should be straight and should hang naturally.
 - (e) *Suprailium*. Pinch a fold at the top front of the right hipbone. The skinfold here is taken slightly diagonally according to the natural fold tendency of the skin.
2. *Measure the appropriate skinfolds*. Pinch a fold of skin between your thumb and forefinger. Pull the fold up so that no muscular tissue is included; don't pinch the skinfold too hard. Hold the calipers perpendicular to the fold and measure the skinfold about 0.5 cm away from your fingers. Allow the tips of the calipers to close on the skinfold and let the reading settle before marking it down. Take readings to the nearest half-millimetre. Continue to repeat the measurements until two consecutive measurements match, releasing and repinching the skinfold between each measurement. Make a note of the final measurement for each site.

Time of day of measurements:

Men

Chest: _____ mm

Abdomen: _____ mm

Thigh: _____ mm

Women

Triceps: _____ mm

Suprailium: _____ mm

Thigh: _____ mm

Determining Percent Body Fat

Add the measurements of your three skinfolds. Use this sum as a point of comparison for future assessments and/or find the percent body fat that corresponds to your total in the appropriate table. For example, a 19-year-old female with measurements of 16 mm, 19 mm, and 22 mm would have a skinfold sum of 57 mm; according to the following table, her percent body fat is 22.7.

Sum of three skinfolds: _____ mm Percent body fat: _____ %

Percent Body Fat Estimate for Women: Sum of Triceps, Suprailium, and Thigh Skinfolts

| Sum of Skinfolts (mm) | Age | | | | | | | | |
|-----------------------------|-------------|-------|-------|-------|-------|-------|-------|-------|---------|
| | Under 22 | 23–27 | 28–32 | 33–37 | 38–42 | 43–47 | 48–52 | 53–57 | Over 57 |
| 23–25 | 9.7 | 9.9 | 10.2 | 10.4 | 10.7 | 10.9 | 11.2 | 11.4 | 11.7 |
| 26–28 | 11.0 | 11.2 | 11.5 | 11.7 | 12.0 | 12.3 | 12.5 | 12.7 | 13.0 |
| 29–31 | 12.3 | 12.5 | 12.8 | 13.0 | 13.3 | 13.5 | 13.8 | 14.0 | 14.3 |
| 32–34 | 13.6 | 13.8 | 14.0 | 14.3 | 14.5 | 14.8 | 15.0 | 15.3 | 15.5 |
| 35–37 | 14.8 | 15.0 | 15.3 | 15.5 | 15.8 | 16.0 | 16.3 | 16.5 | 16.8 |
| 38–40 | 16.0 | 16.3 | 16.5 | 16.7 | 17.0 | 17.2 | 17.5 | 17.7 | 18.0 |
| 41–43 | 17.2 | 17.4 | 17.7 | 17.9 | 18.2 | 18.4 | 18.7 | 18.9 | 19.2 |
| 44–46 | 18.3 | 18.6 | 18.8 | 19.1 | 19.3 | 19.6 | 19.8 | 20.1 | 20.3 |
| 47–49 | 19.5 | 19.7 | 20.0 | 20.2 | 20.5 | 20.7 | 21.0 | 21.2 | 21.5 |
| 50–52 | 20.6 | 20.8 | 21.1 | 21.3 | 21.6 | 21.8 | 22.1 | 22.3 | 22.6 |
| 53–55 | 21.7 | 21.9 | 22.1 | 22.4 | 22.6 | 22.9 | 23.1 | 23.4 | 23.6 |
| 56–58 | 22.7 | 23.0 | 23.2 | 23.4 | 23.7 | 23.9 | 24.2 | 24.4 | 24.7 |
| 59–61 | 23.7 | 24.0 | 24.2 | 24.5 | 24.7 | 25.0 | 25.2 | 25.5 | 25.7 |
| 62–64 | 24.7 | 25.0 | 25.2 | 25.5 | 25.7 | 26.0 | 26.7 | 26.4 | 26.7 |
| 65–67 | 25.7 | 25.9 | 26.2 | 26.4 | 26.7 | 26.9 | 27.2 | 27.4 | 27.7 |
| 68–70 | 26.6 | 26.9 | 27.1 | 27.4 | 27.6 | 27.9 | 28.1 | 28.4 | 28.6 |
| 71–73 | 27.5 | 27.8 | 28.0 | 28.3 | 28.5 | 28.8 | 29.0 | 29.3 | 29.5 |
| 74–76 | 28.4 | 28.7 | 28.9 | 29.2 | 29.4 | 29.7 | 29.9 | 30.2 | 30.4 |
| 77–79 | 29.3 | 29.5 | 29.8 | 30.0 | 30.3 | 30.5 | 30.8 | 31.0 | 31.3 |
| 80–82 | 30.1 | 30.4 | 30.6 | 30.9 | 31.1 | 31.4 | 31.6 | 31.9 | 32.1 |
| 83–85 | 30.9 | 31.2 | 31.4 | 31.7 | 31.9 | 32.2 | 32.4 | 32.7 | 32.9 |
| 86–88 | 31.7 | 32.0 | 32.2 | 32.5 | 32.7 | 32.9 | 33.2 | 33.4 | 33.7 |
| 89–91 | 32.5 | 32.7 | 33.0 | 33.2 | 33.5 | 33.7 | 33.9 | 34.2 | 34.4 |
| 92–94 | 33.2 | 33.4 | 33.7 | 33.9 | 34.2 | 34.4 | 34.7 | 34.9 | 35.2 |
| 95–97 | 33.9 | 34.1 | 34.4 | 34.6 | 34.9 | 35.1 | 35.4 | 35.6 | 35.9 |
| 98–100 | 34.6 | 34.8 | 35.1 | 35.3 | 35.5 | 35.8 | 36.0 | 36.3 | 36.5 |
| 101–103 | 35.3 | 35.4 | 35.7 | 35.9 | 36.2 | 36.4 | 36.7 | 36.9 | 37.2 |
| 104–106 | 35.8 | 36.1 | 36.3 | 36.6 | 36.8 | 37.1 | 37.3 | 37.5 | 37.8 |
| 107–109 | 36.4 | 36.7 | 36.9 | 37.1 | 37.4 | 37.6 | 37.9 | 38.1 | 38.4 |
| 110–112 | 37.0 | 37.2 | 37.5 | 37.7 | 38.0 | 38.2 | 38.5 | 38.7 | 38.9 |
| 113–115 | 37.5 | 37.8 | 38.0 | 38.2 | 38.5 | 38.7 | 39.0 | 39.2 | 39.5 |
| 116–118 | 38.0 | 38.3 | 38.5 | 38.8 | 39.0 | 39.3 | 39.5 | 39.7 | 40.0 |
| 119–121 | 38.5 | 38.7 | 39.0 | 39.2 | 39.5 | 39.7 | 40.0 | 40.2 | 40.5 |
| 122–124 | 39.0 | 39.2 | 39.4 | 39.7 | 39.9 | 40.2 | 40.4 | 40.7 | 40.9 |
| 125–127 | 39.4 | 39.6 | 39.9 | 40.1 | 40.4 | 40.6 | 40.9 | 41.1 | 41.4 |
| 128–130 | 39.8 | 40.0 | 40.3 | 40.5 | 40.8 | 41.0 | 41.3 | 41.5 | 41.8 |

SOURCE: Jackson, A. S., and M. L. Pollock. 1985. Practical assessment of body composition. *Physician and Sportsmedicine* 13(5): 76–90. Reproduced by permission of The McGraw-Hill Companies.

Percent Body Fat Estimate for Men: Sum of Chest, Abdomen, and Thigh Skinfolds

| Sum of Skinfolds (mm) | Age | | | | | | | | |
|-----------------------|----------|-------|-------|-------|-------|-------|-------|-------|---------|
| | Under 22 | 23–27 | 28–32 | 33–37 | 38–42 | 43–47 | 48–52 | 53–57 | Over 57 |
| 8–10 | 1.3 | 1.8 | 2.3 | 2.9 | 3.4 | 3.9 | 4.5 | 5.0 | 5.5 |
| 11–13 | 2.2 | 2.8 | 3.3 | 3.9 | 4.4 | 4.9 | 5.5 | 6.0 | 6.5 |
| 14–16 | 3.2 | 3.8 | 4.3 | 4.8 | 5.4 | 5.9 | 6.4 | 7.0 | 7.5 |
| 17–19 | 4.2 | 4.7 | 5.3 | 5.8 | 6.3 | 6.9 | 7.4 | 8.0 | 8.5 |
| 20–22 | 5.1 | 5.7 | 6.2 | 6.8 | 7.3 | 7.9 | 8.4 | 8.9 | 9.5 |
| 23–25 | 6.1 | 6.6 | 7.2 | 7.7 | 8.3 | 8.8 | 9.4 | 9.9 | 10.5 |
| 26–28 | 7.0 | 7.6 | 8.1 | 8.7 | 9.2 | 9.8 | 10.3 | 10.9 | 11.4 |
| 29–31 | 8.0 | 8.5 | 9.1 | 9.6 | 10.2 | 10.7 | 11.3 | 11.8 | 12.4 |
| 32–34 | 8.9 | 9.4 | 10.0 | 10.5 | 11.1 | 11.6 | 12.2 | 12.8 | 13.3 |
| 35–37 | 9.8 | 10.4 | 10.9 | 11.5 | 12.0 | 12.6 | 13.1 | 13.7 | 14.3 |
| 38–40 | 10.7 | 11.3 | 11.8 | 12.4 | 12.9 | 13.5 | 14.1 | 14.6 | 15.2 |
| 41–43 | 11.6 | 12.2 | 12.7 | 13.3 | 13.8 | 14.4 | 15.0 | 15.5 | 16.1 |
| 44–46 | 12.5 | 13.1 | 13.6 | 14.2 | 14.7 | 15.3 | 15.9 | 16.4 | 17.0 |
| 47–49 | 13.4 | 13.9 | 14.5 | 15.1 | 15.6 | 16.2 | 16.8 | 17.3 | 17.9 |
| 50–52 | 14.3 | 14.8 | 15.4 | 15.9 | 16.5 | 17.1 | 17.6 | 18.2 | 18.8 |
| 53–55 | 15.1 | 15.7 | 16.2 | 16.8 | 17.4 | 17.9 | 18.5 | 19.1 | 19.7 |
| 56–58 | 16.0 | 16.5 | 17.1 | 17.7 | 18.2 | 18.8 | 19.4 | 20.0 | 20.5 |
| 59–61 | 16.9 | 17.4 | 17.9 | 18.5 | 19.1 | 19.7 | 20.2 | 20.8 | 21.4 |
| 62–64 | 17.6 | 18.2 | 18.8 | 19.4 | 19.9 | 20.5 | 21.1 | 21.7 | 22.2 |
| 65–67 | 18.5 | 19.0 | 19.6 | 20.2 | 20.8 | 21.3 | 21.9 | 22.5 | 23.1 |
| 68–70 | 19.3 | 19.9 | 20.4 | 21.0 | 21.6 | 22.2 | 22.7 | 23.3 | 23.9 |
| 71–73 | 20.1 | 20.7 | 21.2 | 21.8 | 22.4 | 23.0 | 23.6 | 24.1 | 24.7 |
| 74–76 | 20.9 | 21.5 | 22.0 | 22.6 | 23.2 | 23.8 | 24.4 | 25.0 | 25.5 |
| 77–79 | 21.7 | 22.2 | 22.8 | 23.4 | 24.0 | 24.6 | 25.2 | 25.8 | 26.3 |
| 80–82 | 22.4 | 23.0 | 23.6 | 24.2 | 24.8 | 25.4 | 25.9 | 26.5 | 27.1 |
| 83–85 | 23.2 | 23.8 | 24.4 | 25.0 | 25.5 | 26.1 | 26.7 | 27.3 | 27.9 |
| 86–88 | 24.0 | 24.5 | 25.1 | 25.7 | 26.3 | 26.9 | 27.5 | 28.1 | 28.7 |
| 89–91 | 24.7 | 25.3 | 25.9 | 26.5 | 27.1 | 27.6 | 28.2 | 28.8 | 29.4 |
| 92–94 | 25.4 | 26.0 | 26.6 | 27.2 | 27.8 | 28.4 | 29.0 | 29.6 | 30.2 |
| 95–97 | 26.1 | 26.7 | 27.3 | 27.9 | 28.5 | 29.1 | 29.7 | 30.3 | 30.9 |
| 98–100 | 26.9 | 27.4 | 28.0 | 28.6 | 29.2 | 29.8 | 30.4 | 31.0 | 31.6 |
| 101–103 | 27.5 | 28.1 | 28.7 | 29.3 | 29.9 | 30.5 | 31.1 | 31.7 | 32.3 |
| 104–106 | 28.2 | 28.8 | 29.4 | 30.0 | 30.6 | 31.2 | 31.8 | 32.4 | 33.0 |
| 107–109 | 28.9 | 29.5 | 30.1 | 30.7 | 31.3 | 31.9 | 32.5 | 33.1 | 33.7 |
| 110–112 | 29.6 | 30.2 | 30.8 | 31.4 | 32.0 | 32.6 | 33.2 | 33.8 | 34.4 |
| 113–115 | 30.2 | 30.8 | 31.4 | 32.0 | 32.6 | 33.2 | 33.8 | 34.5 | 35.1 |
| 116–118 | 30.9 | 31.5 | 32.1 | 32.7 | 33.3 | 33.9 | 34.5 | 35.1 | 35.7 |
| 119–121 | 31.5 | 32.1 | 32.7 | 33.3 | 33.9 | 34.5 | 35.1 | 35.7 | 36.4 |
| 122–124 | 32.1 | 32.7 | 33.3 | 33.9 | 34.5 | 35.1 | 35.8 | 36.4 | 37.0 |
| 125–127 | 32.7 | 33.3 | 33.9 | 34.5 | 35.1 | 35.8 | 36.4 | 37.0 | 37.6 |

SOURCE: Jackson, A. S., and M. L. Pollock. 1985. Practical assessment of body composition. *Physician and Sportsmedicine* 13(5): 76–90. Reproduced by permission of The McGraw-Hill Companies.

Rating Your Body Composition

Refer to Table 6.2 to rate your percent body fat. Record it below:

Rating: _____

Using Your Results

How did you score? Are you at all surprised by your ratings for health risk? Are your current ratings in the range for good health? Are you satisfied with your current body composition? Why or why not?

If you're not satisfied, set a realistic goal for improvement:

What should you do next? Enter the results of this lab in the Preprogram Assessment column in Appendix C. If you've determined that you need to change your body composition, plan your program using the labs in Chapters 7 and 9 and the weight management section of the Daily Fitness and Nutrition Journal. After several weeks or months of an exercise and/or dietary change program, complete this lab again and enter the results in the Postprogram Assessment column of Appendix C.