Performance Benchmarks

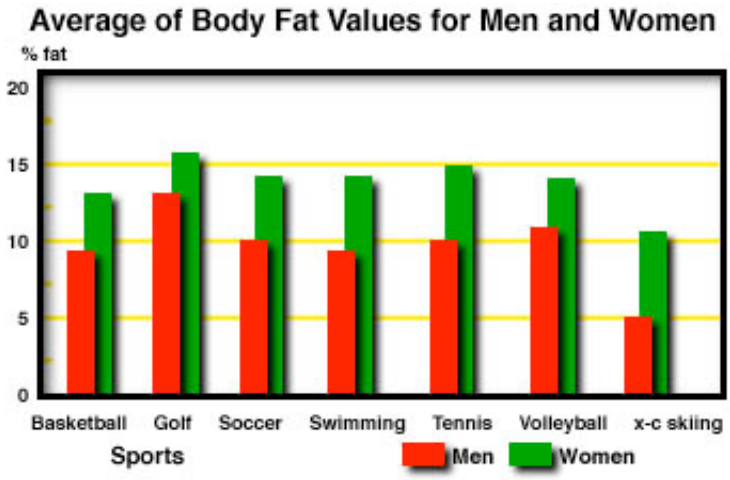
Body Composition and Body Mass

The ideal body composition varies with different sports, but in general the less fat mass, the greater the performance. The body is divided into two components, the fat-free body mass and the fat mass. The fat free mass is composed partly of muscle tissue, which does the work. Body composition refers to the relative percentage of muscle, fat, bone, and other tissue of which the body is composed.

- The average male Olympic cross-country skier is 25 years old, 5'10" tall, weighs 165 pounds and has 5% body fat.
- The average female Olympic cross-country skiers is 25 years old, 5'7" tall, weighs 141 pounds, and has 11% body fat.

Body Composition and Body Mass

The success of an athlete depends a lot on the body type. Body size, build, and body composition can impair or help performance. Athletic performance relates to body type (body shape and size), and body composition (muscular development and amount of body fat). Body fat contributes no strength advantage and limits endurance, speed, and movement through space. Olympic cross country skiers are extremely lean compared to average males and females.

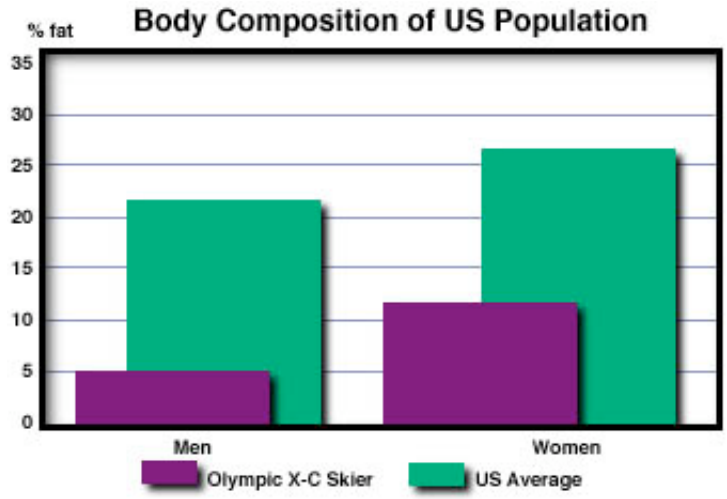


The advantages of an appropriate amount and distribution of body fat are:

- shock absorption (football)
- buoyancy (swimming)
- thermal insulation (swimming)
- fuel stores (cross-country skiing)

The average percent of body fat values differ from sport to sport:

- Basketball (men 9% and women 13%) are higher than cross country skiing (men 5% and women 11%), but are much lower than golf (men 13% and women 16%)



Training correctly can increase muscle mass, and good nutrition and correct exercise can change body composition. Olympic cross-country skiers need to be muscular for energy demands and lean for good performance.

Essential and nonessential fat

Essential fat is necessary for temperature regulation, shock absorption, and regulation of essential body nutrients. Nonessential fat is the result of taking in more calories than you expend. When

nonessential fat accumulates in excessive amounts, and individual may become overfat.

Overfat is more important than overweight in determining health and wellness. The body mass index (BMI) is probably the best way to use height and weight to assess fatness. The BMI can provide guidelines for body fatness, but is not a true measure of body fatness. Thus, it should not be used to assess performance. A person who has a large muscle mass as a result of regular exercise could appear to be overweight using a height and weight table.

Application

Caculate your Body Mass Index:

1. Divide your weight in punds by 2.2 to determine your weight in kilograms
2. Multiply your height in inches by .0254 to determine your height in meters
3. Square your height in meters (multiply your height in mters by your height in meters).
4. Divide the value you obtain in step 3 into your weight in kilograms (step 1).
5. Use the BMI Chart to determine your BMI

Assessing Body Mass and Body Composition

Because the amount of body fat, not the amount of weight, is the important factor in living a healthy life, it is better to determine the percentage of your body weight that is body fat (percent body fat). Measurement of body fat can be done by underwater weighing which is the gold standard,

determining body volume, bioelectric impedance, and skinfold thickness. These methods are estimates and can all produce different numbers. We can assess body composition by many methods. Perhaps the most used is the skinfold assessment.

Application

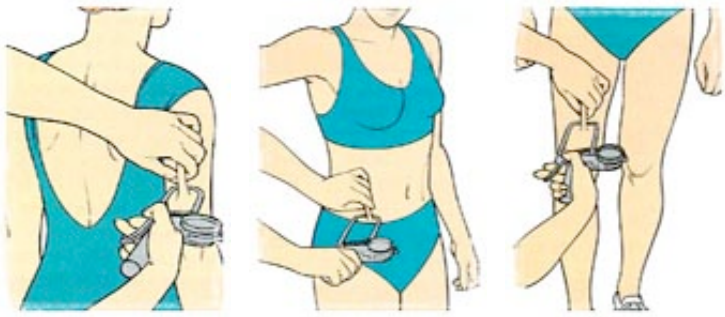
Evaluating body fatness

Skinfold measurements are made with skinfold calipers. The following procedures must be used for each skinfold site:

1. Use your thumb and index finger of both hands to "draw up" a layer of skin and fat.
2. "Draw up" the skinfolds in a vertical line. Do not pinch the skinfold.
3. Once you have drawn the skinfold, let go with your right hand and pick up the caliper.
4. Place the jaws of the caliper over the location of the skinfold, allow the tips of the caliper to close n the skinfold at a level about where the skin would naturally be.
5. Let the caliper adjust for two or three seconds, not the thickness of the skinfold in millimeters.
6. Three measurements should be taken at each site. Use the average to determine your measurement.

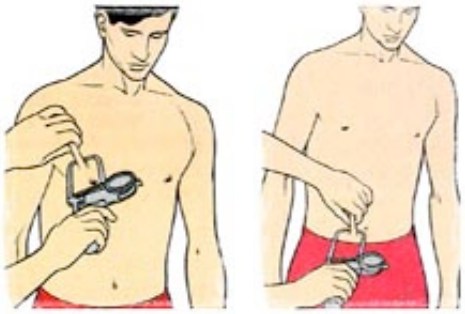
Skinfold location for women

- Triceps - One half the distance between the soulder and elbow, use your dominant side.
- Iliac Crest - Diagonally on the natural line of the skin on the iliac crest.
- Abdominal - One inch to the right of the navel



Skinfold loactions for men

- Thigh - See above
- Chest - Above and to the right of the right nipple. May be done diagonally.
- Abdominal - One inch to the right of the navel



Calculating fatness from the skinfold

- Sum the three skinfolds
- Use the skinfold sum and your age to determine your percent fat in the body composition chart.

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