Section 10

Body Composition

Water (is approximately 60% of the average adult's weight.) Water content in protein-type tissues, such as muscle is about 72%. Water makes up approximately 10% of fat - type tissue.); bone-tissue; protein - tissue and fat.

Body Fat - is the total amount of fat in the body.

Lean Body Mass - consists of muscles, bones and organs such as the heart, liver, and kidneys.

Approximate Percentages of Body Weight

Attributable to Body Fat and

Lean Body Mass

	Adult Male	Adult Female
Total Body Fat	15%	26%
Essential Fat	3%	15%
Storage Fat	12%	11%
Lean Body Mass	**85%**	**74%**
Muscle	43%	36%
Bone	15%	12%
Other Tissues	27%	26%

Body Fat Percentage Levels

Rating	Males(18-30)	Females (18-30)
Athletic	6-10%	10-15%
Good	11-14%	16-19%
Acceptable	15-18%	20-25%

Overweight	19-24%	26-29%
Obese	25% or over	30% or over

Techniques to Estimate Body Fat

Bioelectrical impedance analysis (BIA) - is a computer formula which predicts body fat based on your estimated body water content.

Girth Measurements - a measure of regional fat distribution is the Waist: Hip Ratio (WHR), which is the waist girth, measured at the narrowest section of the waist, divided by the gluteal or hip girth, measured at the largest circumference including the buttocks.

Excessive body fat in males is a WHR greater than 0.90 - 0.95; females - a WHR greater than 0.80 - 0.85.

Skinfold Techniques - skinfold measures are taken at various body sites such as the arms and waist which are inserted into a formula to estimate percentage of body fat.

Underwater Weighing

Weight Control Basics

To maintain your current body weight you must have energy balance.

ENERGY OUTPUT = ENERGY INPUT

Negative energy balance - an individual loses weight if energy output is greater than energy input

Positive energy balance - if energy input is greater than energy output, an individual gains weight.

Proper energy balance is the key to weight control.

Energy expenditure is due to:

Basal metabolic rate, BMR (60-75% of an individual's total daily energy expenditure is accounted for by the BMR), which is the measurement of energy expenditure in the body under resting, post-absorptive conditions.

Resting metabolic rate, RMR, is the BMR plus any energy expenditure due to digestion of food, and sedentary activities.

Exercise metabolic rate, EMR, is the energy expenditure during physical exercise. In sedentary individuals, EMR accounts for 10-15% of the daily energy expenditure. In physically active individuals, EMR may account for 30% or more of the daily energy expenditure. Exercise helps to release fat (free fatty acids) from adipose tissues. The fat then travels in the blood to muscles, where the free fatty acids are oxidized to provide energy.

Body Weight Regulators

The control of appetite is centered in the hypothalamus portion of the brain. The hypothalamus has a hunger center which stimulates eating behavior and a satiety center, which when stimulated, inhibits the hunger center.