Chapter 5: Nutritional Considerations

What influences what we eat

- Money
- Culture
- Environment
- Diet
- Friends
- Mood/emotion

Nutrients

- Diet does not always mean losing weight
  - Refers to a person's food selection
- Eating = survival
- Nutrients have 3 roles
  - Grow, maintain and repair all body cells
  - Regulate body processes
  - Supply energy for cells

Nutrition Basics

- Nutrition= Science of substances found in food (nutrients) that are essential to life

  Macronutrients- have calories and provide energy

  – Carbohydrates (CHO)
  – Protein
  – Fat

  Micronutrients- no calories and help with body functions

  – Vitamins
  – Minerals
  – Water

Carbohydrates (CHO)

- Body's most efficient energy source
- Accounts for 55-70% of total caloric intake or (4 kcal/g)
- Two Types: Simple (sugars) and complex (starch and fiber)
  - Examples of Simple Sugars
    - fruits, syrup, jams/jelly, and honey
    - Glucose-blood sugar
    - table sugar

- Starches and Fibers- Complex Carbs (CHO)
  - Examples: Rice, potatoes, breads, fibers
  - Body cannot use starch directly
    - Broken down in simple sugars
    - Unused starches and sugars are stored as glycogen to be used by the body later

Fats

- Most concentrated source of energy
- Essential for normal growth and development
- <25% of caloric intake or 9 kcal/g
- Saturated vs. unsaturated
  - Saturated - fatty acids derived from animal products (mayonaise, butter, lard, fat on meat products)
  - Unsaturated - plant derivatives – (olive oil, vegetable oil, canola oil)

Fats are chemical compounds known as lipids, which are fatty or oily substances that do not dissolve in water

Cholesterol is another type of lipid. Cholesterol circulates in the blood. Your body makes cholesterol or cholesterol can be obtained by eating animal products in your diet.

Proteins

- Required for growth, maintenance, and repair of the body
- Aid with hormone production
- Should encompass 12-15% of daily caloric intake or 4 kcal/g

- Amino Acids-building blocks of protein
  - 20 amino acids
  - Most can be produced by the body while others (essential) must be consumed
  - Animal products contain all essential amino acids
  - Incomplete sources (plants sources) do not contain all essential amino acids

FYI-20 Amino Acids

- Alanine, Arginine, Asparagine, Aspartic acid, Cysteine, Glutamic acid, Glutamine, Glycine, Histidine*, Isoleucine*, Leucine*, Lysine*, Methionine*, Phenylalanine*, Proline, Serine, Threonine*, Tryptophan*, Tyrosine, and Valine*.
- *Essential AA must be obtained from diet.

Vitamins

- Vitamins (13) serve as regulators in many body processes
- Fat soluble
  - Vitamins A, D, E, K
  - Found in fatty portion of foods and oils
- Water soluble
  - Vitamin C, B-complex vitamins (8 B vitamins)
  - Help to regulate metabolism but cannot be stored
  - Each serves a series of roles

- Anitoxidants
  - May prevent premature aging, cancers, heart disease and other health problems
  - Include vitamins A, C, E
  - Found in a number of dark green, deep yellow and orange fruits and vegetables
  - Supplements
- Vitamin Deficiencies
  - Illness that results from a deficit in a particular vitamin/mineral
  - Are avoidable if an adequate diet is consumed

Minerals

- **20 minerals have essential roles in the body**
- **Many are stored in liver and bones**
  - ***Iron (energy metabolism and oxygen transport)**
  - **Magnesium(energy supplying reactions)**
  - ***Calcium (bone formation, clotting, muscle contractions)**
  - **Sodium and Potassium (nerve conduction)**
  - ***Athletes are most commonly deficient in iron and calcium.**

Minerals are Electrolytes

- **Minerals are needed for body processes.**
- **Sodium, potassium, calcium, magnesium, chloride are most common.**
- **Serious electrolyte disturbances, such as dehydration and overhydration, may lead to cardiac and neurological complications and, unless they are rapidly resolved, will result in a medical emergency.**

Water

- **Most essential nutrient and most abundant in body (60% of body weight)**
- **Essential for all chemical processes**
- **Lack of water (dehydration) can lead to illness and death**
- **8-10 cups of water are needed daily**

How much water should you drink DAILY?

- **Use this formula**

½ of your body weight (lbs) ÷ 2 =

_# ounces of water

Functions of water

- **Transport nutrients and oxygen through the body and helps to get rid of wastes from the body**
- **Provide the proper environment for the body's chemical reactions to occur.**
- **Regulate body temperature.**

Nutrient Requirements and Recommendations

- Amount of nutrient required to prevent deficiency diseases
- Vary by individuals and across populations
- Requirements vs. Recommendations
  - RDA (Recommended Daily Allowance) vs. DRI (Dietary Reference Intake)
- Food Labels
  - Aids consumers in determining levels of nutrients in foods

Nutrition Facts
Serving Size 1/2 cup (114g)
Servings Per Container 4

Amount Per Serving	
Calories 260	Calories from Fat 120
	% Daily Value*
Total Fat 13g	20%
Saturated Fat 5g	25%
Cholesterol 30mg	10%
Sodium 660mg	28%
Total Carbohydrate 31g	11%
Dietary Fiber 0g	0%
Sugars 5g	
Protein 5g	
Vitamin A 4%	Vitamin C 2%
Calcium 15%	Iron 4%

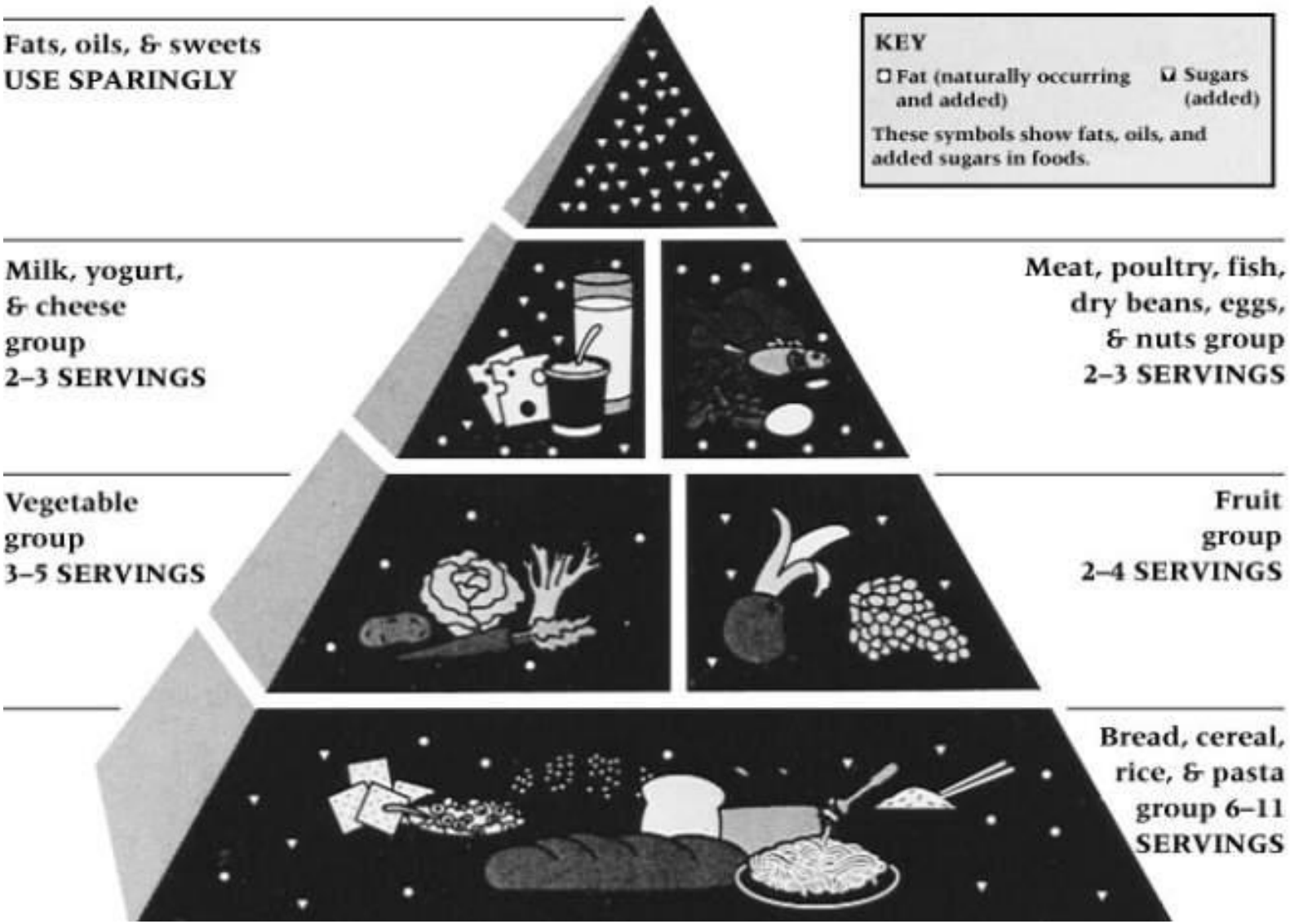
*Percent Daily Values are based on a 2000 Calorie diet. Your daily values may be higher or lower depending on your calorie needs.

	Calories: 2000	2500
Total Fat	Less than 65g	80g
Sat. Fat	Less than 20g	25g
Cholesterol	Less than 300mg	300mg
Sodium	Less than 2,400mg	2,400mg
Total Carbohydrate	300g	375g
Dietary Fiber	25g	30g

Calories per gram
Fat 9 • Carbohydrate 4 • Protein 4

Food Guide Pyramid

A Guide to Daily Food Choices



Nutrition and Physical Activity

- Activity increases need for energy!
- Athletes need to consume more calories!
- Athletes also need to drink more water and include electrolyte sources (sports drinks/juice/milk)!

Pre-event Nutrition

- Long term food consumption is more important than immediate consumption
- Purpose should be to provide competitor with nutrients/energy and fluids for competitions (taking digestibility into consideration)
- Food generally takes 4 hours to clear stomach and upper GI tract

Body Composition

- **Ideal body weight = age-related height/weight chart (BMI)**

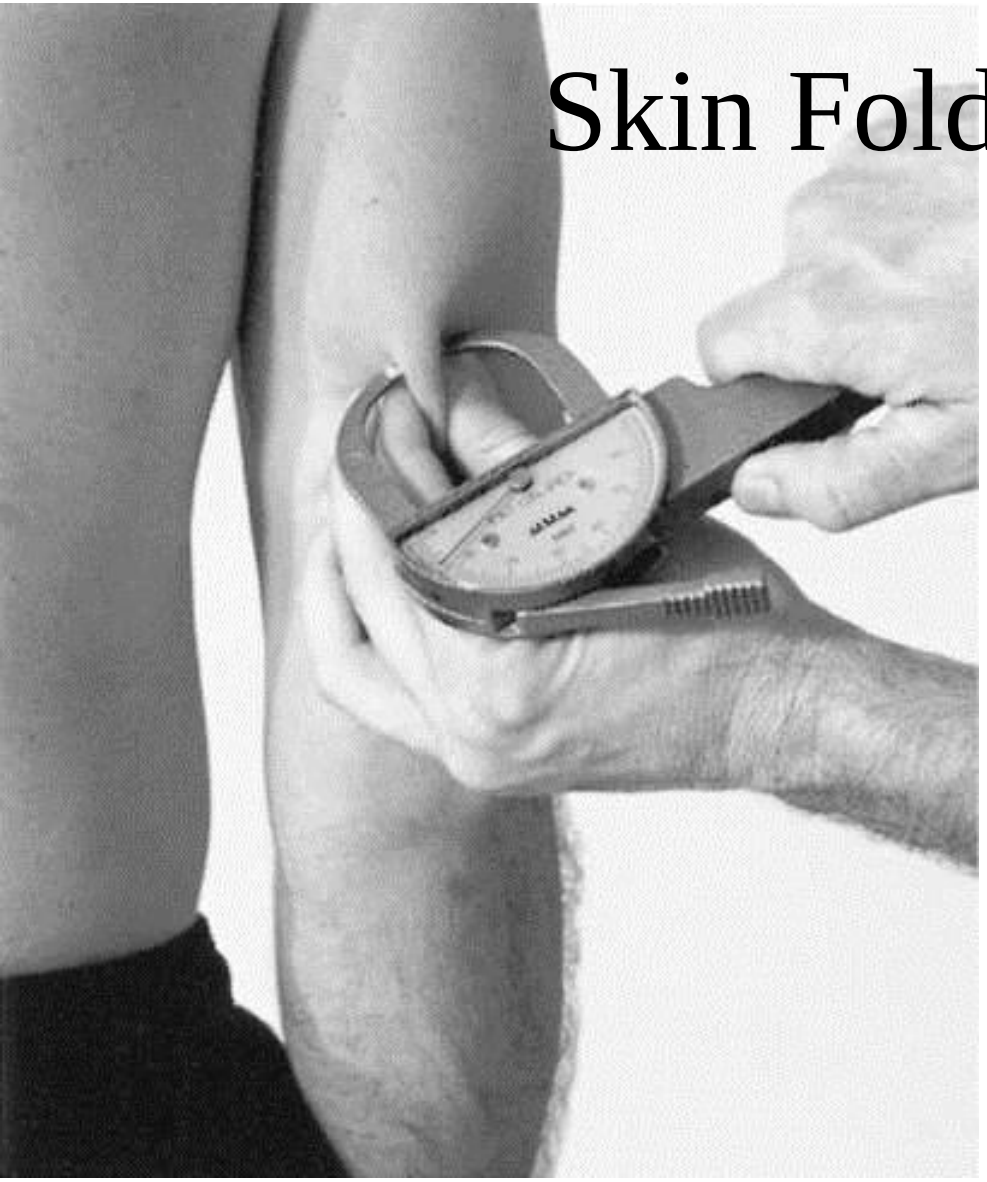
  http://www.smartbmicalculator.com/

- **Fat vs. nonfat components of body = body composition**

- **Non-fat or lean tissue (lean body weight)**
  - **bone, muscle, tendon, connective tissue**

- **Averages**
  - **Female 12-25% body weight = fat**
  - **Male 5-18% body weight = fat**
  - **Should not fall below 3% for males and 12 % for females**

Skin Fold Caliper



Assessing Caloric Balance

- Caloric balance = Calories consumed - calories burned

  – Calories are burned through:
    - basal metabolism (calories expended at rest)
    - Work/exercise (activity that requires more energy than sleeping)

    http://www.myfitnesspal.com/exercise/lookup

Methods of Weight Loss

- **Every 15 minutes of moderate exercise burns 100 calories.**
- **Dieting alone results in lean body tissue loss**
  - **Should not drop below 1000-1200 calories for women and 1200-1400 for men**

- **The key is moderation**
  - **A combination of dieting and exercise**
  - **A negative energy balance must be achieved**
  - **Loss of 1.5-2.0 pounds per week is adequate**
  - **Weight loss of more than 4-5 pounds per week can be attributed to dehydration**
  - **It takes time to put weight on and also takes time to take it off**
- **To lose 1 pound of fat = deficit of 3500 calories**

Methods of Weight Gain

- **Aim should be to increase lean body mass**
- **Increased physical activity (muscle work) and dietary modifications**
- **Approximately increase 500-1000 calories per day in your diet**
- **A 1-2 pound per week gain is adequate**

Eating Disorders

- **Epidemic, especially in sports**
- **1 out of 200 girls age 12-18 will develop some pattern of eating disorder (1-2% of population)**
- **Bulimia**
  - **Commonly females - ranging in age from adolescence to middle age**
  - **Periods of starvation, bingeing (thousands of calories) and purging through vomiting, fasting, and laxatives/diuretics**

Characteristics for Bulimics

- **Typically bulimic athletes are white, middle to upper-middle class**
- **Perfectionist, obedient, over compliant, highly motivated, successful academically, well-liked, and a good athlete**
- **Most common in gymnastics, track, dance**
- **Occasionally seen in male gymnasts and wrestlers**

– **Bingeing and purging can result in stomach rupture, abnormal heart rhythm, liver damage, tooth decay, chronically inflamed or irritated mouth and throat lining**

Anorexia Nervosa

- **Characterized by distorted body image and constant concern about weight gain**
- **Impacts mostly females, but same characteristics as a bulimic**
- **Starts often with adolescents and can be life threatening**
- **While the athlete tends to be too thin they continue to feel fat (altered BODY IMAGE)**
- **Deny hunger and are hyperactive**
- **Highly secretive**

- **Early intervention is critical with eating disorders**
  - **Empathy is a must**
- **Psychological counseling is key**
- **Must have athlete recognize the problem, accept the benefits of assistance and must voluntarily accept help for treatment to work**
- **15-21% of all anorexics die from this disorder.**

Female Athlete Triad

- **Potentially fatal problem**
- **Combination of eating disorder, amenorrhea (no period) and osteoporosis (brittle bones)**
- **Some suggest eating disorders may exist in 62% of females in certain sports and amenorrhea found in 60%**
- **Major risk is the fact that bone lost may not be regained**