What are vitamins?

- Essential substances that must come from the diet
  - The body cannot make enough to meet its needs

- Lack of essential vitamins can cause:
  - Signs and symptoms
  - Disease (vitamin-specific)

- A common myth: Vitamins give us energy

- The truth: Vitamins aid in chemical reactions in the body that produce energy

- May be water- or fat-soluble
  - Water-soluble vitamins are generally excreted from the body (except B-6 and B-12)
  - Fat-soluble vitamins are generally stored in the body (except vitamin K)

- If possible, eating a good diet with a variety of foods, including plenty of fresh fruits and vegetables, is the best way to obtain the essential vitamins we need
## Vitamins A - K

### Water Soluble
- B vitamins
  - Thiamine
  - Riboflavin
  - Niacin
  - Pantothenic Acid
  - Biotin
  - Vitamin B-6
  - Folate
  - Vitamin B-12
- Vitamin C
- Choline

### Fat Soluble
- Vitamin A
- Vitamin D
- Vitamin E
- Vitamin K
About Water-Soluble Vitamins

- Dissolve in water
  - Readily excreted (lost in urine, sweat, etc.)
- Can be lost during cooking
- Once absorbed, form co-enzymes
  - Necessary for enzyme activity
  - Important for making energy
- Absorption problems
  - Decreased ability to absorb some B vitamins
  - Alcohol abuse affects absorption of most B vitamins
B Vitamins and Vitamin C

- Many sources available to us
- Many foods are fortified or enriched
- At risk populations:
  - Smokers
  - Alcohol abusers
  - Older adults
- Possible long-term health problems from deficiencies
  - Heart disease
  - Cancer
Common B vitamins

> Thiamine (B<sub>1</sub>) – functions in nerve transmission, metabolism of carbohydrates and alcohol
  – Daily needs: Women: 1.1 milligrams; Men: 1.2 milligrams
  – Food sources: enriched and whole grain foods, pork

> Riboflavin (B<sub>2</sub>) – important for energy metabolism, metabolism of carbohydrates, proteins and fats
  – Daily needs: Women: 1.1 mg; Men: 1.3 mg
  – Food sources: milk, yogurt, enriched cereals and grains

> Niacin (B<sub>3</sub>) – needed to obtain energy from carbohydrates, proteins and fats, synthesis of fat and cholesterol
  – Daily needs: Women: 1.4 mg; Men: 1.6 mg
  – Food sources: meats, fish, poultry, enriched grains and cereals and whole grains
More B vitamins

> Vitamin B₆ – acts as a coenzyme in the body to metabolize proteins, helps metabolize carbohydrates and fats; needed to make hemoglobin -- carries the oxygen in blood
  - Daily needs: Women: 1.3 – 1.5 mg; Men: 1.3 – 1.7 mg
  - Food sources: found in many different foods such as meat, fish, poultry, many vegetables and some fruits, peanut butter, cereals

> Folate – important in making DNA (create and maintain cells); helps body use amino acids (from protein) and maintain red blood cell supply; supplemented in enriched cereals to help prevent neural tube birth defects
  - Daily needs: Adults: 400 micrograms of DFE (dietary folate equivalents)
  - Food sources: enriched pastas, grains, breads, cereals, leafy green vegetables, such as spinach, broccoli, lettuce & greens; dried beans and peas

> Vitamin B₁₂ – needed for healthy red blood cell production and to maintain healthy nerve cells and tissues
  - Daily needs: Adults: approx. 2.4 mcg
  - Food sources: foods from animal sources such as meats, fish, poultry, dairy products; synthetic B-12 is found in soy products and cereals (important for people who don’t eat animal products)
Vitamin C

- Also known as ascorbic acid
  - needed to make certain amino acids (building blocks of protein)
  - needed to make collagen (important for skin and skin structures)
  - acts as an antioxidant

- Daily needs:
  - Women: 75 mg
  - Men: 90 mg
  - Smokers need an extra 35 mg daily

- Food sources: orange and grapefruit juices, tomatoes, peppers, potatoes, broccoli, citrus fruits (most fruits and vegetables contain some vitamin C)
Review of fat-soluble vitamins

- A, D, E and K

- Vitamin A – a group of vitamins often called retinoids
  > Important for healthy vision (function of eyes), involved in cell reproduction and a healthy immune system
  > Daily needs: Women: 700 mcg RAE; Men: 900 mcg RAE
  > RAE – retinol activity units; 3.3 RAE = 1 IU International Unit

  > Food sources: organ meats (e.g., liver), milk, cereals, cheese, and eggs; also, from carrots, spinach and sweet potatoes (plant form – carotenoid – converted to vitamin A in the body)
More fat-soluble vitamins

- Vitamin D – known as the sunshine vitamin
  - Converted in the skin to vitamin D when exposed to ultraviolet rays from the sun
    - Two forms: Vitamin D2 (ergocalciferol) and D3 (cholecalciferol)
    - D3 is made in our skin in response to ultraviolet light
  - Functions – build and maintain bone strength; helps the bones to absorb calcium
  - Research into relationship to diabetes, heart disease and cancer underway

- Daily needs: Adults: 5 – 15 mcg (200 - 600 IU)
  **There has been a lot of controversy about this lately, with some recommending much higher levels
  - some new recommendations call for 600 IU daily in adults and
  800 IU daily in adults over 70 years of age

- Food sources: milk, fortified cereals, yogurt, fatty fish
Vitamins E & K

- **Vitamin E** – acts as an antioxidant; helps prevent unnecessary clotting / clumping of blood platelets
  - Daily needs: Adults: 15 mg
  - Food sources: vegetable oils, nuts, seeds and some leafy green vegetables and fortified cereals

- **Vitamin K** – essential for blood clotting; also is a coenzyme in the process of calcium binding to the bones to maintain bone strength
  - Daily needs: Women: 90 mcg; Men: 120 mcg
  - Food sources: green vegetables, such as broccoli, asparagus, spinach, salad greens, Brussels sprouts, cabbage; also vegetable oils and margarine
What is a dietary supplement?

- A product taken by mouth that contains a dietary ingredient to supplement the diet; may include:
  - Vitamins
  - Minerals
  - Herbs or other botanicals
  - Amino acids
  - Enzymes, organ tissues, glandulars and metabolites
  - May also have extracts or concentrates

- May be tablets, capsules, softgels, gelcaps, liquids or powders
  - Can also be in a bar form, but labeling must not represent as a conventional food or a sole item of a meal or diet

- Generally considered to be “foods” as opposed to drugs and are required to be labeled as a dietary supplement
Responsibility of manufacturers

- Must determine that the supplements are safe
- Must list all ingredients on the label
- Must not make false or misleading claims about their products
- Do not need to seek approval to market and sell products
  > Exception: if a “new dietary ingredient” is included, must submit safety data and other information prior to marketing
  > New dietary ingredients are those not sold in U.S. before October 15, 1994
- Must register with Food and Drug Administration (FDA)
- All requirements are part of the Dietary Supplement Health and Education Act (DSHEA) of 1994
What is the role of FDA?

- Food and Drug Administration
  - Does not approve dietary supplements (unlike prescription drugs)
  - Provides oversight for the safety of these products through efforts of FDA’s Center for Food Safety and Applied Nutrition
    - Monitors marketplace for potential illegal products
    - May inspect manufacturers and distributors
    - Monitors Internet
    - Responds to consumer and trade complaints
  - Does not routinely perform laboratory analyses to confirm ingredients
  - Must prove that a dietary supplement or ingredient is “unsafe” before it can act to restrict its use or cause it to be removed from the marketplace

**Because of the limited resources of the FDA, it focuses on health emergencies and products that may have caused illness or injuries**
How you can help to ensure your safety when taking / evaluating dietary supplements

- Learn as much as you can before purchasing and taking any dietary supplement
  - Read the label
  - Contact the manufacturer with questions
  - Go to: www.fda.gov/Food/DietarySupplements/ConsumerInformation/ucm110567.htm
  - (Tips for the Savvy Supplement User: Making Informed Decisions And Evaluating Information)
    - Includes information on how to evaluate research findings and health information online

- Talk to your doctor and/or pharmacist

- Be wary of claims that sound too good to be true

- Report problems to your doctor and to FDA:
  www.fda.gov/Safety/ReportaProblem/ConsumerComplaintCoordinators/default.htm
When are vitamins and supplements needed?

- Poor or limited diet
  > E.g., vegan and/or vegetarian may require added vitamins and/or supplements

- Certain diseases that prevent absorption of vitamins and nutrients

- Pregnancy

- Smokers?

- Known deficiencies

- Other
Drug – vitamin interactions

- Range from mild to moderate to severe
  - E.g., Vitamin K should not be taken by a person taking warfarin
  - Some foods may contain Vitamin K and should be avoided

- May increase or decrease the effectiveness of the medication

- Some interactions can be life-threatening, but most are mild to moderate

- Read labels of OTC and food supplements to know what is in them

- Consult your physician and pharmacist when starting any new vitamin / supplement regimen if on other medications

- To check for vitamin / herb / supplement – medication interactions, go to: http://www.nlm.nih.gov/medlineplus/druginfo/natural/983.html#DrugInteractions
Summary

- Eat a healthy, balanced diet with lots of fruits and vegetables
- Avoid excessive alcohol
- If you smoke, try to quit
- Talk to your doctor and / or pharmacist about specific concerns and needs
  > Evaluate any interactions with medications you may be taking
- Learn as much as you can about any product(s) you are considering
A few words about staying healthy and using medications safely
Your role in staying healthy

> Understand and maximize the benefits of diet and exercise to stay healthy

> Learn about and follow recommendations for vaccinations, routine tests and other health-preserving actions and behaviors

> When medications are needed, ask your doctor about generics

> When medications are prescribed, talk to your doctor AND your pharmacist to make sure you understand what it’s used for and how to take it

> Take the medications prescribed by your doctor.
  > If you have questions or concerns, contact your doctor or your pharmacist.
  > Remember, you can talk to your Medco pharmacist 24/7 by calling the number on the back of your ID card and asking to speak with a pharmacist.
Understanding your medications is critical to your health and safety

> Create a medication list and update it regularly.

> When your doctor gives you a new medication, ask questions before you leave the office.
  – Ask if your new medication replaces any medication you are already taking
  – If your doctor gives you samples, ask him / her to check to ensure that there are no interactions with your other medications.

> When you get your medication filled, check to ensure that what you receive is what you expected.

*If you have ANY questions or doubts, or if something doesn’t look right, STOP and ask – it could save your life or the life of someone you love*