

Young and Middle Adults

- The primary concerns of these years include:
 - ✓ Maintenance of health
 - ✓ Eating a balanced diet
 - ✓ Staying physically active
 - ✓ Reducing the risks of chronic diseases

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Older Adults

- Age 65 years and older
- Changes to the body include:
 - ✓ Decreased muscle and lean tissue
 - ✓ Increased fat mass
 - ✓ Decreased bone density
 - ✓ Decreased immune function
 - ✓ Impaired absorption of nutrients

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Fastest Growing Age Group in the U.S.: The "Oldest Old"

- Since 1960, the number of people ≥ 85 y of age has doubled
- This increase is 5X higher than the rate of the general population

Age Group	Relative Increase
65-74	Low
75-84	Medium
85+	High (5X)

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"Graying" of America

- We are living longer, but not necessarily healthier...
 - Currently 13% of the population is ≥ 65 y
 - Accounts for ~30% of all prescription medications
 - ~40% of acute care hospital stays
 - ~50% of the federal health budget
 - Of this group, **85% have nutrition-related problems**

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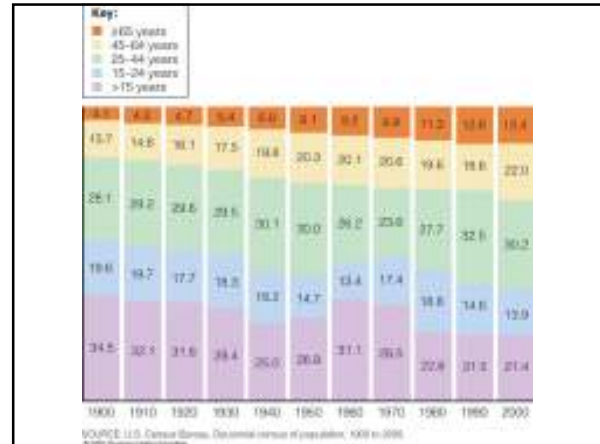
Nutrient Needs of the Older Adult

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Nutrition and Longevity

- Good nutrition and regular physical activity can increase life expectancy, support good health, prevent or prolong the onset of disease, and improve the quality of life.
- There are many healthy habits that can increase life span.
- A person's physiological age and chronological age may be different.
- The benefits of energy restriction in humans in the later years are being studied.

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Nutrition and Longevity

- Observation of Older Adults
 - ✓Healthy Habits
 - Sleeping regularly and adequately
 - Eating well-balanced meals, including breakfast, regularly
 - Engaging in physical activity regularly
 - Not smoking
 - Not using alcohol, or using it in moderation
 - Maintaining a healthy body weight

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Nutrition and Longevity

- Observation of Older Adults
 - ✓Physical Activity
 - Many benefits including lower weight, greater flexibility, increased endurance, better balance and health, and a longer life span
 - Regular physical activity can prevent or delay the decrease in muscle mass and strength that occur with age.
 - Active people benefit from higher energy and nutrient intakes.
 - Start easy and build slowly
 - Check with physician

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	Endurance	Strength	Balance	Flexibility
Examples:				
Start easy	Do about 3 minutes on most or all days.	Begin with 2-pound weights, do 1 set of 8 reps, then raise a weight.	Walk with a cane or chair until you feel that you can do it safely.	Hold about 10 seconds in each stretch 2 times.
Progress gradually to goal	By doing 30 minutes consistently on most or all days.	Increase weight to 5 to 10 sets of 8-12 repetitions 3 times a week.	Do not feel into table or chair, use caution.	Hold stretch 30 seconds in each stretch 3 times.
Caution and concerns:	Stop if you are breathing or heart rate isn't back to normal after 5 minutes or you feel dizzy or short of breath.	Remember not to over-exert and to do your reps (do not hold breath) one slowly, slowly, breathe in.	Remember, balance tests require some strength, so use caution or stop if you are unable to do it safely.	Stretch after strength and endurance exercises for 20 minutes. Stretching is most effective when done slowly, steadily, consistently, and gently.

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Nutrition and Longevity

- Manipulation of Diet
 - ✓Energy Restriction in Animals
 - Shown to prolong life
 - Shown to delay onset of or prevent disease
 - ✓Energy Restriction in Human Beings
 - Applying results in animal studies to human beings is problematic.
 - Moderation of energy intake may be valuable.

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The Aging Process

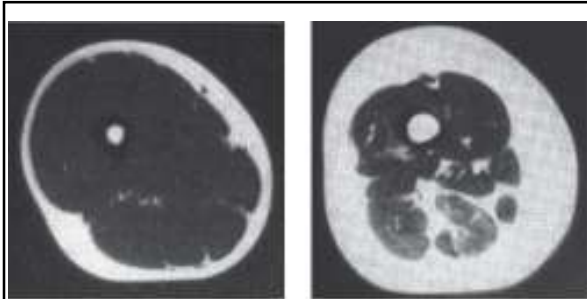
- Physiological, psychological, social, and economic changes that accompany aging affect nutritional status.
- Everyday stress can influence physical and psychological aging.
- Stressors elicit the body's stress response.
- Physical stressors include alcohol and drug abuse, smoking, pain and illness.
- Psychological stressors include exams, divorce, moving, and the death of loved ones.
- Malnutrition is common.

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The Aging Process

- Physiological Changes
 - ✓ Body Weight
 - Two thirds of the adults in the U.S. are overweight or obese.
 - Older adults with low body weight may be unprepared to fight illness and disease.
 - ✓ Body Composition
 - Sarcopenia is the loss of muscle mass.
 - Nutrition and exercise play a role in maintaining muscle mass.

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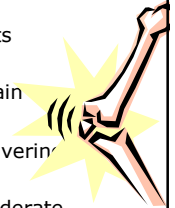


These cross sections of two women's thighs may appear to be about the same size from the outside, but the 20-year-old woman's thigh (left) is dense with muscle tissue. The 64-year-old woman's thigh (right) has lost muscle and gained fat, changes that may be largely preventable with strength-building physical activities.

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Nutrition-Related Conditions

- **Osteoarthritis**
 - ✓ Deterioration of cartilage in joints
 - ✓ Related to overweight
 - ✓ Weight loss may relieve some pain
- **Rheumatoid arthritis**
 - ✓ Immune system attacks bone covering
 - ✓ Inflammatory response
 - ✓ Vegetables and olive oil may moderate response
 - ✓ Omega-3 fatty acids reduce joint tenderness
 - ✓ Vitamins C, E reduce oxidative damage to joint membranes that cause inflammation, swelling



The Aging Process

- Physiological Changes
 - ✓ Immune System
 - Compromised immune systems can occur with age.
 - Incidences of infectious disease increase
 - ✓ GI Tract
 - Slower motility resulting in constipation
 - Atrophic gastritis impairs digestion and absorption of nutrients due to stomach inflammation, bacterial overgrowth, and a lack of hydrochloric acid and intrinsic factor.
 - Dysphagia is defined as difficulties in swallowing and can result in nutritional deficiencies.

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The Aging Process

- Physiological Changes
 - ✓ Tooth Loss
 - Tooth loss and gum disease can interfere with food intake.
 - Edentulous is lack of teeth.
 - Conditions that require dental care
 - Dry mouth
 - Eating difficulty
 - No dental care in 2 years
 - Tooth or mouth pain
 - Altered food selections
 - Lesions, sores, or lumps in mouth
 - Ill-fitting dentures

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The Aging Process

- Physiological Changes
 - ✓ Sensory Losses and Other Physical Problems
 - Vision problems can make driving and shopping difficult.
 - Taste and smell sensitivities may diminish.

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The Aging Process

- Other Changes
 - ✓ Psychological Changes
 - Depression and loss of appetite commonly occur together.
 - Support and companionship of family and friends are helpful.
 - ✓ Economic Changes
 - Older adults have lower incomes and are at risk for poverty.
 - Only 1/3 receive aid from federal assistance programs.
 - ✓ Social Changes
 - Loneliness is directly related to low energy intakes.
 - Malnutrition is common.

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Energy and Nutrient Needs of Older Adults

- There are many nutrient concerns for aging adults.
- Supplements are not routinely recommended.
- Nutrient needs and health needs are highly individualized.

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Energy and Nutrient Needs of Older Adults

- Energy and Energy Nutrients
 - ✓ Energy needs decrease by around 5% per decade.
 - ✓ Protein to protect muscle mass, boost the immune system, and optimize bone mass
 - ✓ Carbohydrate for energy
 - ✓ Fiber and water to reduce constipation
 - ✓ Fat to enhance flavors of foods and provide valuable nutrients

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Older Adults

- Macronutrients:
 - ✓ Energy needs usually decrease due to reduced activity levels
 - ✓ Recommendations for fat, carbohydrate, and proteins intakes are the same as for younger adults
 - ✓ Older adults can consume slightly less fiber

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Older Adults

Changes in Nutrient Recommendations	Rationale for Changes
Increased need for vitamin D from 5 µg/day for young adults to 10 µg/day for adults 51 to 70 years and to 15 µg/day for adults over age 70 years.	<ul style="list-style-type: none"> - Decreased bone density - Decreased ability to convert vitamin D to its active form in our skin - Decreased absorption of dietary calcium
Increased need for calcium from 1,000 mg/day for young adults to 1,200 mg/day for adults 51 years of age and older.	<ul style="list-style-type: none"> - Decreased bone density - Decreased absorption of dietary calcium
Decreased need for fiber from 38 grams/day for young men to 30 grams/day for men 51 years and older. Decreases for women are from 25 grams/day for young women to 21 grams/day for women 51 years and older.	<ul style="list-style-type: none"> - Decreased energy intake
Increased need for vitamin B ₁₂ and B ₆ .	<ul style="list-style-type: none"> - Lower levels of stomach acid - Decreased absorption from gastrointestinal tract - Increased need to reduce homocysteine levels and to optimize immune function

Energy and Nutrient Needs of Older Adults

- Vitamins and Minerals
 - ✓ Vitamin B₁₂ from fortified foods and supplements is especially needed for those with atrophic gastritis.
 - ✓ Vitamin D from fortified milk and sunshine is needed to prevent bone loss.
 - ✓ For those who avoid milk and milk products, calcium can be obtained from fortified juices, powdered milk, or supplements.
 - ✓ Iron from red meats consumed with vitamin C-rich foods

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Older Adults

- Micronutrients:
 - ✓ Calcium and vitamin D requirements increase due to poor calcium absorption
 - ✓ Iron needs decrease
 - ✓ Zinc intake should be maintained for optimizing immune function
 - ✓ Adequate intake of B-complex vitamins is a special concern

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Energy and Nutrient Needs of Older Adults

- Nutrient Supplements
 - ✓ Vitamin D and calcium for osteoporosis
 - ✓ Vitamin B₁₂ for pernicious anemia
 - ✓ Iron

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Energy and Nutrient Needs of Older Adults

- Water
 - ✓ Dehydration increases risks for urinary tract infections, pneumonia, pressure ulcers, confusion and disorientation.
 - ✓ Fluid needs are not recognized.
 - ✓ Mobility and bladder problems
 - ✓ Water recommendations: at least 6 glasses per day

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Older Adults

- Fluid:
 - ✓ AI for fluid is the same as for younger adults:
 - Men: 3.7 liters/day
 - Women: 2.7 liters/day
 - ✓ Older adults are especially susceptible to dehydration

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Older Adults

- Nutrition Related Concerns:
 - ✓ Many chronic diseases are more prevalent in overweight or obese adults
 - ✓ Underweight may result from illness, disability, loss of sense of taste or smell, depression, social isolation
 - ✓ Dental health issues may cause older adults to avoid meats, firm fruits and vegetables
 - ✓ Vision problems
 - Can affect ability to shop, cook
 - Antioxidants may reduce macular degeneration
 - ✓ Osteoporosis
 - Common in elders, especially women
 - Maintain calcium, vitamin D, exercise

Nutrition-Related Concerns of Older Adults

- Adults over 65 have many problems that might be preventable through good nutrition.
- There is a strong need to solve vision, arthritis, and brain related problems.

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Nutrition-Related Concerns of Older Adults

- Vision
 - ✓ Cataracts are thickenings of the eye lenses.
 - Consuming foods or taking supplements of vitamin C, vitamin E, and carotenoids may decrease the risk or slow progression of cataracts.
 - Some association with obesity

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Nutrition-Related Concerns of Older Adults

- Vision
 - ✓ Macular degeneration is a deterioration of the macula (center of the retina) area of the eye that leads to vision problems and blindness.
 - Antioxidants, zinc, leutein, zeaxanthins, and omega-3 fatty acids are preventative factors.
 - Total fat intake may be a risk factor.

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Nutrition-Related Concerns of Older Adults

- Arthritis
 - ✓ Osteoarthritis (also called degenerative arthritis)
 - Risk factors include age, smoking, BMI at 40, and lack of hormone therapy in women.
 - Painful deterioration of the cartilage in the joints
 - Associated with overweight

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Nutrition-Related Concerns of Older Adults

- Arthritis
 - ✓ Rheumatoid Arthritis
 - Immune system attacks bone coverage
 - Omega-3 fatty acids may reduce joint tenderness and motility.
 - Vitamin C, vitamin A, and carotenoids as antioxidants often help.

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Nutrition-Related Concerns of Older Adults

- Arthritis
 - ✓ Gout
 - Uric acid deposits in the joints
 - Purines are converted to uric acid.
 - There are increased uric acid levels when meat and seafood are consumed.
 - Milk products lower uric acid levels.

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Nutrition-Related Concerns of Older Adults

- Arthritis
 - ✓Treatment
 - Relief from discomfort and improve mobility
 - No cure
 - Alternative therapies such as glucosamine and chondroitin may help but this is not confirmed.
 - Drugs and supplements may affect nutritional status.

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Nutrition-Related Concerns of Older Adults

- The Aging Brain
 - ✓Nutrient Deficiencies and Brain Function
 - Neurotransmitters need precursor nutrients.
 - Senile dementia
 - Neurons diminish as people age.

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TABLE 17-2 Summary of Nutrient-Brain Relationships

Brain Function	Depends on an Adequate Intake of:
Short-term memory	Vitamin B ₁₂ , vitamin C, vitamin E
Performance in problem-solving tests	Biotin, folate, vitamin B ₁₂ , vitamin C
Mental health	Thiamin, niacin, zinc, folate
Cognition	Folate, vitamin B ₁₂ , vitamin B ₆ , iron, vitamin E
Vision	Essential fatty acids, vitamin A
Neurotransmitter synthesis	Tyrosine, tryptophan, choline

Nutrition-Related Concerns of Older Adults

- The Aging Brain
 - ✓Alzheimer's Disease
 - Abnormal deterioration of the brain
 - Free radicals and beta-amyloid
 - Senile plaques and neurofibrillary tangles develop in the brain.
 - Acetylcholine breakdown may affect memory.
 - Drugs are useful.
 - Maintaining body weight is important; Alzheimer's patients may forget to consume foods.

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Food Choices and Eating Habits of Older Adults

- Older people benefit from the social interaction and the nutrients provided through food assistance programs.
- Older adults should purchase foods carefully and prepare foods creatively.

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Food Choices and Eating Habits of Older Adults

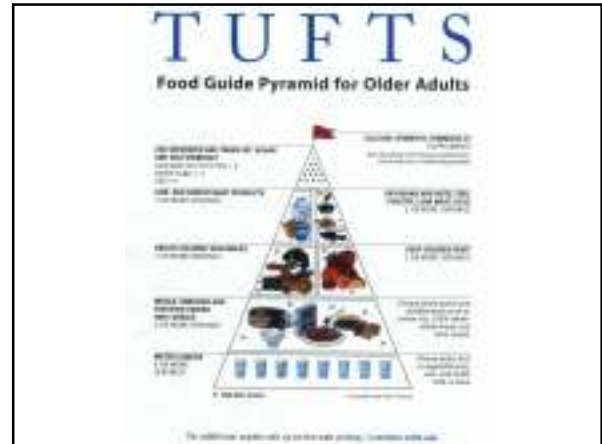
- Food Assistance Programs
 - ✓Congregate meals are group settings at community centers.
 - ✓Meals on Wheels is a home-delivered meal program.
 - ✓The Senior Farmers Market Nutrition Program allows low-income older adults to exchange coupons for fruits, vegetables, and herbs.

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Food Choices and Eating Habits of Older Adults

- Meals for Singles
 - ✓ Foodborne Illness
 - Greater risk in older adults
 - If severe, can cause paralysis, meningitis, or death
 - ✓ Spend Wisely
 - Buying proper quantities
 - Buy foods with longer shelf life – ultrahigh temperature (UHT) for milk products
 - ✓ Be Creative
 - Use fresh foods for different recipes.
 - Dine with others.
 - Freezing meals

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Benefits of Good Nutrition

- Delays onset of some diseases
- Improves current condition
- Improves quality of life
- Decreases the length of stay in hospitals
- More independence



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Consequences of Nutritional Deficiencies in Older Adults

- Protein-energy undernutrition
- Increase risk for diseases
- Compromised recovery



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Community Nutrition Services for the Elderly

- Elder Nutrition Program
 - ✓ Congregate meal program
 - Provides lunch at a central location
 - ✓ Meals-on-wheels
 - Provides 1/3 of the nutrient needs
- Federal commodity distribution
 - ✓ Low-income elderly
 - ✓ Food stamp
 - ✓ Farmer's Market program



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Nutrient-Drug Interactions

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Older Adults

- Nutrition Related Concerns:
 - ✓ Some medications can alter nutrient absorption or decrease appetite
 - ✓ A balanced diet containing ample folate, vitamin B12, and macronutrients may improve memory and decrease the risk of Alzheimer's disease or other forms of dementia.

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Nutrient-Drug Interactions

- Polypharmacy
 - ✓ Fill 13 prescriptions/yr on average
 - ✓ May take as many as 6 drugs at a time
- Potential mechanisms of action:
 - ✓ May increase loss of nutrient
 - Diuretics leach potassium out of the body
 - Blood loss from long-term aspirin use can lead to Fe-deficient anemia
 - ✓ May affect appetite
 - Some antidepressants
 - Certain antibiotics



Nutrient-Drug Interactions

- Both prescription and nonprescription (over-the-counter) drugs may have nutrition related consequences.
- Individuals need to consult with all of their physicians and pharmacists to avoid harmful drug interactions.

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The Actions of Drugs

- Modifies one or more of the body's functions
- Desirable and undesirable effects

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The Interactions between Drugs and Nutrients

- Altered Food Intake
 - ✓ Altering appetite
 - ✓ Interfering with taste and smell
 - ✓ Inducing nausea or vomiting
 - ✓ Changing oral environment
 - ✓ Causing sores or inflammation of the mouth

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The Interactions between Drugs and Nutrients

- Altered Nutrient Absorption
 - ✓ Changing acidity of the digestive tract
 - ✓ Altering digestive juices
 - ✓ Altering motility of the digestive tract
 - ✓ Inactivating enzyme systems
 - ✓ Damaging mucosal cells
 - ✓ Binding nutrients

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The Interactions between Drugs and Nutrients

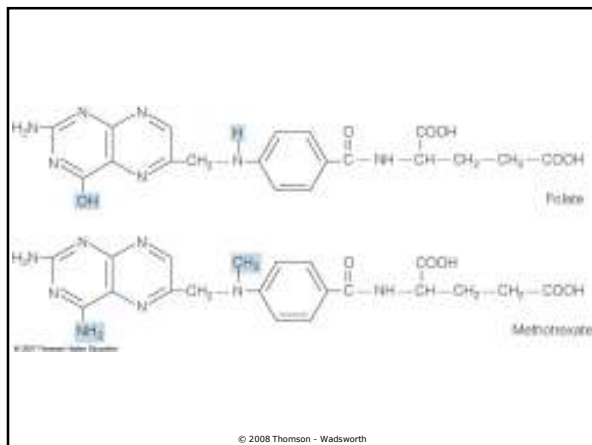
- Altered Drug Absorption
 - ✓ Changing acidity of the digestive tract
 - ✓ Stimulating secretions of the digestive juices
 - ✓ Altering rate of absorption
 - ✓ Binding to drugs
 - ✓ Competing for absorption sites

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The Interactions between Drugs and Nutrients

- Altered Metabolism
 - ✓ Acting as structural analogs
 - ✓ Competing with each other for metabolic enzyme systems
 - ✓ Altering enzyme activity and contributing pharmacologically active substances

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The Interactions between Drugs and Nutrients

- Altered Nutrient Excretion
 - ✓ Altering reabsorption in the kidneys
 - ✓ Displacing nutrients from their plasma protein carriers
- Altered Drug Excretion
 - ✓ By changing acidity level of the urine

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The Inactive Ingredients in Drugs

- Other ingredients in drugs may include sugar, sorbitol, lactose, and sodium.
- Sugar, Sorbitol, and Lactose
 - ✓ Sugar may be a problem for diabetics
 - ✓ Sorbitol may cause diarrhea
 - ✓ Lactose can be a problem for those with lactose intolerance
- Sodium can be found in antibiotics and antacids

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