Learning Objectives

• Identify specific problems with sensations experienced by some geriatric patients.
• Discuss effects of drug toxicity and alcoholism in older adult.
• Identify factors that contribute to environmental emergencies in geriatric patient.
Learning Objectives

• Discuss prehospital assessment and management of depression and suicide in older adult.
• Describe epidemiology, assessment, and management of trauma in geriatric patient.
• Identify characteristics of elder abuse.

Demographics, Epidemiology, and Societal Issues

• More than 34 million Americans (12 percent of U.S. population) are 65+ years of age
  — Soared during last 100 years
  — Fertility rates in U.S. have dropped
  • Will be fewer persons under 65 years of age to support cost of health care and living expenses of those over 65 years of age

• By year 2050, nearly 25 percent of Americans will be eligible for Medicare
  — Population over 85 years of age will have grown from 4 million to 19 million
  • Creates many challenges
  • Society will need to provide quality, cost-effective health care and support increasing health and living expenses for elderly
Demographics, Epidemiology, and Societal Issues

• To meet needs of aging population properly
  – Public must become better educated about needs of elderly because caregiving often falls to families and friends
  – Current and new health care professionals must be educated on special needs of aging population
  – Aging of U.S. population demands continued and expanded research efforts into chronic diseases that affect aged and their families

• Health care professionals need to reform health care financing, delivery, and administrative structures to accommodate predominance of chronic illness among the aging population
  – Health care professionals must develop solutions for long-term care needs of growing aging population
    • Solutions must address emotional and financial needs of older adults and their families
    • Must address financial influence of long-term care in U.S.

• Key issues to consider
  – Advance directives
  – Durable power of attorney
  – Do-not-resuscitate orders
Living Environments and Referral Sources

- Elderly often receive assistance in independent and dependent living environments
  - Receive this help through local, state, and national programs and other resource agencies
  - Paramedic should be familiar with programs in community that offer assistance to elderly

Physiological Changes of Aging

- Gerontology
  - Study of problems of all aspects of aging
  - Aging process proceeds at different rates in different persons
  - Organ systems age at differing rates within individual
  - Predictable functional declines occur in all persons with increasing age

Physiological Changes of Aging

- As rough guideline, changes begin to occur at rate of 5 to 10 percent for each decade of life after 30 years of age
  - Aging process affects all body systems
    - Effects on specific organ systems particularly relevant to older adult occur in following systems
      - Respiratory
      - Cardiovascular
      - Renal
      - Nervous
      - Musculoskeletal systems
Consider your family members and friends who are in their 40s, 60s, or 80s. What age-related changes have you noticed?

Respiratory System Changes

- Respiratory function generally declines as lung tissue ages
  - Reduced pulmonary capacity results from changes in lung and chest wall compliance
  - With aging, chest wall becomes stiffer as bony thorax becomes more rigid
  - Lung elastic recoil decreases
  - Despite loss of elasticity, which would tend to increase total lung capacity, total lung capacity remains same
    - Due to opposing loss of chest wall compliance and weakened respiratory muscles

Respiratory System Changes

- Diameter of alveoli increases
  - Distal airways tend to collapse on expiration
  - Changes lead to increase in residual volume and decrease in vital capacity
  - Consequently, by 75 years of age
    - Vital capacity may decrease by as much as 50 percent
    - Maximum breathing capacity by as much as 60 percent
    - Maximum work rate and maximum oxygen uptake by as much as 70 percent
Respiratory System Changes

• Arterial oxygen pressure (PaO2) also slowly decreases with age
  – Arterial carbon dioxide pressure stays same
  – Most likely related to much greater reserve in carbon dioxide elimination than in oxygen absorption

• At 30 years of age, PaO2 of healthy person breathing ambient air at sea level is about 90 mm Hg (90 torr)
  – At 70 years of age, expected PaO2 is 70 mm Hg (70 torr)
    • Produce diminished ventilatory response to hypoxia and hypercapnia

• Other factors that affect respiratory system
  – Loss of cilia in airways
  – Diminished cough reflex
  – Impaired gag reflex
    • Can impair bodily defense against inhaled bacteria and particulate matter
    • Decline in these defense mechanisms makes infectious pulmonary diseases of older adult more common
    • Makes these infections harder to resolve
## Cardiovascular System Changes

- Cardiac function declines with age as a result of nonischemic physiological changes and a high incidence of atherosclerotic coronary artery disease.
  - Sorting out changes solely due to aging from those associated with ischemia is difficult:
    - Coronary artery disease is so prevalent in older adults.
    - Even with aging alone, structural and physiological changes occur that limit cardiac function in the cardiovascular system.

## Cardiovascular System Changes

- Changes include:
  - Diminished ability to raise heart rate even in response to exercise or stress.
  - Decrease in compliance of ventricle.
  - Prolonged duration of contraction.
  - Decreased responsiveness to catecholamine stimulation.
  - Between 30 and 80 years of age, resting cardiac output decreases about 30 percent.

## Cardiovascular System Changes

- Combined with progressive increase in peripheral vascular resistance that occurs after 40 years of age, decrease in cardiac output yields significant drop in organ perfusion:
  - Myocardial hypertrophy, coronary artery disease, hemodynamic changes predispose geriatric patient to:
    - Dysrhythmias
    - Heart failure
    - Sudden cardiac arrest when cardiovascular system is placed under unexpected stress.
Cardiovascular System Changes

- Changes occur in electrical conduction pathways of heart
  - Occur as cells in sinoatrial and atrioventricular nodes and rest of conduction system lose ability to function
  - Often lead to dysrhythmias
    - Chronic atrial fibrillation
    - Sick sinus syndrome
    - Various types of bradycardias
    - Heart blocks
  - All can contribute to decline in cardiac output

What lifestyle choices can slow down these physiological changes of aging?

Renal System Changes

- Structural and functional changes in kidneys occur during aging process
  - Renal blood flow falls an average of 50 percent between 30 and 80 years of age
    - Associated with proportional decrease in glomerular filtration rate of about 8 mL/min per decade
Renal System Changes

- Renal mass decreases by about 20 percent between 40 and 80 years of age
  - Steady decline in kidney function places geriatric patient at greater risk for renal failure from
    - Trauma
    - Obstruction
    - Infection
    - Vascular occlusion

Renal System Changes

- As patient ages, significant impairment develops in
  - Renal concentrating ability
  - Sodium conservation
  - Free water clearance (diuresis)
  - Glomerular filtration
  - Renal plasma flow
  - Hepatic blood flow decreases
    - Limits effectiveness of liver metabolism

Renal System Changes

- Decreases in kidney and liver function and loss of muscle and body water make geriatric patient more susceptible to electrolyte disturbances
  - Also make geriatric patient more likely to experience problems with medications or drugs
Adverse Drugs Events in Older Adults

• Adverse drug events (ADEs),
  – Reactions and interactions
  – Common cause of hospital admission
  – Important cause of morbidity and death
• Overall incidence of serious ADEs in general hospitalized population in U.S. is believed to be between 6 and 7 percent

Adverse Drugs Events in Older Adults

• Studies suggest that more than 80 percent of ADEs causing admission or occurring in hospital are dose-related
  – Many ADEs are predictable and some are potentially avoidable
  – Preventable ADEs medications categories
    • Cardiovascular medications
    • Diuretics nonopioid analgesics
    • Hypoglycemics

Adverse Drugs Events in Older Adults

• Studies suggest that more than 80 percent of ADEs causing admission or occurring in hospital are dose-related
  – Most common preventable events
    • Electrolyte/renal
    • GI tract
    • Hemorrhagic
    • Metabolic/endocrine
    • Neuropsychiatric
Nervous System Changes

• Intellectual functioning deteriorates selectively and may result from many organic causes
  – Beginning at about 30 years of age, total number of neurons in certain cortical areas decreases gradually
    • By 70 years of age, 10 percent reduction in brain weight has occurred

Nervous System Changes

• Central nervous system (CNS) changes
  – Factors
    • Decreased cerebral blood flow
    • Changes in location and amounts of specific neurotransmitters

Nervous System Changes

• Central nervous system (CNS) changes
  – Velocity of nerve conduction in peripheral nervous system decreases with aging
    • May lead to changes in motor or position sense
    • Delays in reaction time and motor responses
  – Other gradual changes in patient’s nervous system can result in
    • Decreased visual acuity
    • Auditory keenness
    • Sleep changes
Nervous System Changes

- Toxic or metabolic factors that can affect mental functioning
  - Use of medications
  - Electrolyte imbalances
  - Hypoglycemia
  - Acidosis
  - Alkalosis
  - Hypoxia

- Liver, kidney, and lung failure
- Pneumonia
- Congestive heart failure (CHF)
- Cardiac dysrhythmias
- Infection
- Development of benign or malignant tumors

Musculoskeletal System Changes

- As body ages
  - Muscles shrink
  - Muscles and ligaments calcify
  - Intervertebral disks become thin
- Osteoporosis is common in geriatric patients (especially in women)
  - An estimated 68 percent of geriatric patients show some degree of kyphosis (“humpback posture”)
Musculoskeletal System Changes

• These musculoskeletal changes result in
  – Decrease in total muscle mass
  – Decrease in height of 2 to 3 inches
  – Widening and weakening of certain bones
  – Posture that impairs mobility and alters balance of body
    • As a result, falls are common
    • Falls often are associated with significant morbidity and mortality

Musculoskeletal System Changes

• Prevention strategies that can decrease injuries associated with falls
  – Using assistive devices (e.g., walker or cane)
  – Removing scatter rugs and securing loose carpeting
  – Removing items that may cause tripping
  – Providing and using handrails
  – Ensuring adequate lighting
Musculoskeletal System Changes

- Prevention strategies that can decrease injuries associated with falls
  - Removing clutter from the environment
  - Arranging furniture for walking ease
  - Using nonslip decals in bathtub or shower
  - Providing handrails on bathtubs, showers, and commodes
  - Suggesting patients consult with their physician regarding medicines if they are taking medication that increases risk of falls

Consider a patient who has significant kyphosis. What aspects of care will you need to alter to immobilize the spine of this patient?

Other Physiological Changes

- Other physiological changes that occur with aging
  - Changes in body mass and total body water
  - Decreased ability to maintain internal homeostasis
  - Decrease in function of immunological mechanisms, nutritional disorders, and decreases in hearing and visual acuity
Other Physiological Changes

- As individual approaches 65 years of age
  - Lean body mass may decrease as much as 25 percent
  - Fat tissue may increase as much as 35 percent
    - Can affect dosage and frequency of administration of fat-soluble drugs
    - There is more drug per weight of metabolically active tissue and larger reservoir for accumulation of drug
    - Decrease in total body water is likely to increase concentration of water-soluble drugs

Other Physiological Changes

- Ability of body to maintain normal temperature through thermoregulatory mechanisms declines over time
  - Begins at about 30 years of age
  - Geriatric patient is at greater risk for cold- and heat-related conditions
    - Hypothermia
    - Heat exhaustion
    - Hyperthermia

Other Physiological Changes

- Several factors contribute to increased risk of thermoregulatory disorders
  - Impaired sympathetic nervous system function
  - Decreased capacity for peripheral vasoconstriction
  - Lowered metabolic rate
  - Poor peripheral circulation
  - Chronic illness
Other Physiological Changes

- Because of decline in many body functions
  - Specific illness or injury often puts geriatric patient “over the edge”
  - Without adequate compensatory mechanisms to manage event

Other Physiological Changes

- Aging causes the following
  - Decrease in primary antibody response and cellular immunity
  - Elevations in amount of abnormal immunoglobulins and immune complexes
  - These changes increase risk of infection, autoimmune disorders, and perhaps cancer
  - In addition, infections may not produce usual signs and symptoms

Other Physiological Changes

- About 1 in 8 deaths in geriatric patients results from cancer
  - In younger patients, cancer often is main or only disease from which they suffer
  - Geriatric patients often have more than one disease and disability
Other Physiological Changes
• Signs and symptoms may result from other maladies
  – Bowel habits
  – Rectal bleeding
  – Malaise
  – Fatigue
  – Weight loss
  – Anorexia

Other Physiological Changes
• Treatment with chemotherapy often results in immunosuppression
  – Increases risk of infection and often masks typical signs and symptoms associated with infection

Other Physiological Changes
• Many geriatric patients consume less than minimum daily requirement of most vitamins
  – May be result of
    • Loneliness and depression
    • Decreased sensitivity to taste
    • Decreased appetite
    • Financial difficulties
    • Physical infirmity
    • Decreased vision
    • Combination of these elements
Other Physiological Changes

• Other factors associated with poor nutrition
  – Poor dentition and reduced mastication
  – Decreased esophageal motility
  – Frequent hypochlorhydria (low stomach acid secretion)
  – Decreased intestinal secretions that reduce absorption

Other Physiological Changes

• Geriatric patients easily can become victims of malnutrition
  – Can cause
    • Dehydration
    • Hypoglycemia
    • Numerous other complications

What effects can poor nutrition have on body function?
General Principles in Assessment of the Geriatric Patient

• Consider special characteristics of geriatric patients that can complicate clinical evaluation
  – Geriatric patients are likely to suffer from more than one illness at a time
  – Chronic problems can make assessment for acute problems difficult
  – Signs or symptoms of chronic illness can be confused with signs or symptoms of acute problem
  – Aging can affect individual’s response to illness or injury

General Principles in Assessment of the Geriatric Patient

• Consider special characteristics of geriatric patients that can complicate clinical evaluation
  – Pain may be diminished or absent
  – Patient or paramedic can underestimate severity of a condition
  – Social and emotional factors may have greater influence on health in geriatric patients than in any other age group
  • Patient fears losing autonomy
  • Patient fears hospital environment
  • Patient has financial concerns about health care

Patient History

• Gathering history from geriatric patient usually requires more time than with younger patients
  – Patient’s age
  – Chronic illness
  – Medication use
  – May have physical impediments such as hearing loss and visual impairment
  – Questioning patient who is fatigued or easily distracted also may lengthen interview process
Patient History

• Use following techniques when communicating with geriatric patients
  – Always identify yourself
  – Speak at eye level to ensure that patient can see you as you communicate
  – Locate a hearing aid, eyeglasses, and dentures (if needed)
  – Turn on lights

Patient History

• Use following techniques when communicating with geriatric patients
  – Speak slowly, distinctly, and respectfully
  – Use patient’s surname, unless patient requests otherwise
  – Listen closely
  – Be patient
  – Preserve dignity
  – Use gentleness

Why should you ask geriatric patients to bring all of their medications to the hospital?
Physical Examination

• When conducting the physical examination, consider the following six points
  – Patient may tire easily
  – Geriatric patients often wear many layers of clothing for warmth
    • May hamper examination
  – Respect patient’s modesty and need for privacy unless it interferes with care

Physical Examination

• When conducting the physical examination, consider the following six points
  – Explain actions clearly before examining all geriatric patients
    • Important with patients with diminished sight
  – Be aware that patient may minimize or deny his or her symptoms
    • Denial may be due to fear of being bedridden or institutionalized or losing self-sufficiency
  – Try to distinguish symptoms of chronic disease from acute problems

Physical Examination

• If time allows, assess geriatric patient’s immediate surroundings for
  – Evidence of alcohol or medication use
  – Presence of food
  – General condition of housing
  – Signs of adequate personal hygiene
    • Observations help provide information to physician about patient’s general health and ability for self-care after release from hospital
Physical Examination

• Question friends or family members about patient’s appearance and responsiveness now versus patient’s normal appearance, responsiveness, other characteristics
  – Discreetly ask about advance directives and initiation of care for patient
    • If available, obtain them and convey information to medical direction
    • Ensure gentle handling and padding for patient comfort if transport is needed

Pulmonary System

• Specific illnesses of pulmonary system common in elderly patients
  – Bacterial pneumonia
  – Chronic obstructive pulmonary disease
  – Pulmonary embolism

Bacterial Pneumonia

• Leading cause of death in geriatric age group and often is fatal in frail adults
• Geriatric patients are more likely to develop bacteremia
• More susceptible to several respiratory germs (e.g., gram-negative bacilli)
• Susceptibility, associated with presence of chronic disease, impairs respiratory tract clearance
• Allows germs to grow in throat that then may travel to or be aspirated into lungs
Bacterial Pneumonia

• Because of decreased lung function, often may be associated with respiratory failure
  – Risk factors for bacterial pneumonia
    • Institutional environments
    • Feeding tubes
    • Chronic diseases
    • Compromise of immune system

Bacterial Pneumonia

• Signs of pulmonary congestion often is absent in geriatric patient
  – Fever
  – Productive cough
  – Pleurisy
  – Atypical presentation is responsible for common delay in diagnosis

Bacterial Pneumonia

• Possible signs and symptoms
  – Alterations in mental status
  – Cough
  – Fever (variable)
  – Shortness of breath
  – Tachycardia
  – Tachypnea
Bacterial Pneumonia

• Geriatric patients with pneumonia may be too weak to cough or produce sputum
  – May not be able to breathe deeply
  – Breath sounds may be misleading because of preexisting emphysema or chronic CHF
    • Tachycardia and tachypnea often are most reliable indicators of bacterial pneumonia in prehospital setting

Bacterial Pneumonia

• Emergency care
  – Manage life threats
  – Maintain oxygenation
  – Provide transport for physician evaluation
• Linked to high rate of hospital admission
  – Generally managed with antibiotics

Why is flu season linked to an increase in pneumonia in the elderly?
Chronic Obstructive Pulmonary Disease

- Major health problem in U.S.
  - Common finding in patient with history of smoking
  - Usually associated with various diseases that result in reduced expiratory air flow
  - Exacerbation of COPD often follows acute respiratory infection that causes
    - Airway edema
    - Bronchial smooth muscle irritability
    - Increased mucus secretion

- Airway abnormalities may lead to factors associated with acute decompensation, including
  - Limited air flow
  - Increased work of breathing
  - Dyspnea
  - Ventilation-perfusion mismatching
  - Hypoxemia
  - Respiratory acidosis
  - Hemodynamic compromise

- Signs and symptoms
  - Extreme anxiety
  - Cyanosis
  - Wheezing
  - Abnormal or diminished breath sounds associated with marked dyspnea and use of accessory muscles
  - Dysrhythmias
  - Paradoxical breathing
  - Jugular vein distention
  - Decreased oxygen saturation levels (per pulse oximetry)
Chronic Obstructive Pulmonary Disease

• Observe full history of event, including any past history of intubation or steroid therapy
• Be prepared for aggressive airway management
  – Care is aimed at correcting life-threatening hypoxemia and improving airflow
    • Use of airway and ventilatory support with supplemental oxygenation
    • Administration of bronchodilators by inhalation or injection may be indicated
    • Failure to begin aggressive treatments to correct acidosis and hypoxia from COPD can lead to progressive decline in patient’s condition

Pulmonary Embolism

• Life-threatening cause of dyspnea, associated with
  – Venous stasis
  – Heart failure
  – COPD
  – Malignancy
  – Immobilization

Pulmonary Embolism

• Most form in veins of legs
  – Travel through femoral veins to inferior vena cava and heart
  – Clinical presentation often is misleading in geriatric patients and frequently misdiagnosed
**Pulmonary Embolism**

- Signs and symptoms
  - Can vary greatly
  - Left ventricular failure with sudden tachypnea
  - Unexplained tachycardia (hallmark sign)
  - Atrial fibrillation

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**Pulmonary Embolism**

- Signs and symptoms
  - Could be signs solely of underlying venous thrombosis
    - Calf discomfort without tenderness
    - Mild calf or ankle edema
    - Increased warmth
    - Dilation of superficial veins in one foot or leg

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**Pulmonary Embolism**

- Can precipitate CHF
- May be mistaken for bacterial pneumonia in geriatric patients
What other conditions have similar cardiovascular signs and symptoms?

Pulmonary Embolism

- Emergency care
  - Ensure adequate airway, ventilatory, and circulatory support
  - Immobilize and elevate an affected extremity
  - Rapidly transport patient for physician evaluation

Myocardial Infarction

- In-hospital care
  - Analgesics
  - Bed rest
  - Hemodynamic stabilization with intravenously administered fluids and vasopressors to support BP
  - Efforts to prevent further embolization
  - Thrombolytics sometimes given to lyse thrombus
  - Anticoagulants to prevent further emboli
Myocardial Infarction

• Chest pain as symptom of MI becomes less frequent by 70 years of age
  – Only 45 percent of patients over 85 years of age with MI have this complaint
  – Lack of typical chest pain can cause MI to go unrecognized in geriatric patient

Myocardial Infarction

• Chest pain as symptom of MI becomes less frequent by 70 years of age
  – Major risk factors that paramedic should evaluate when assessing patient for MI
    • Previous MI
    • Angina
    • Diabetes
    • Hypertension
    • High cholesterol level
    • Smoking

Myocardial Infarction

• Some geriatric patients have chest pain or discomfort
  – Many complain only of vague symptoms
    • Dyspnea (most common sign in patients over 85 years of age)
    • Abdominal or epigastric distress
    • Fatigue
Myocardial Infarction

- In patients older than 85 years, atypical presentation for MI should be anticipated
  - For many geriatric patients, event is totally “silent”
  - May be result of decreased visceral sensory function or higher incidence of mental deterioration in this age group

Myocardial Infarction

- In patients older than 85 years, atypical presentation for MI should be anticipated
  - Silent MIs are almost always marked by atypical complaint
    - Fatigue
    - Breathlessness
    - Nausea
    - Abdominal pain
  - Must maintain high index of suspicion for MI in elderly patients with unusual warning signs or symptoms
    - Consider performing 12-lead ECG if patient has these complaints

What hormonal change in older women increases their risk for heart disease?
Myocardial Infarction

- Emergency care
  - Airway, ventilatory, and circulatory support
  - Oxygen administration and pain management therapy
  - Management of serious dysrhythmias according to advanced life support protocol
  - Rapid and gentle transportation for physician evaluation

Heart Failure

- More frequent in geriatric patients, occurring in about 10 percent of people over age of 80
  - Most common reason for admission to acute care hospital in patients age 65 and older
  - Has larger incidence of noncardiac causes
  - Occurs when ventricular output cannot meet metabolic demands of the body

Heart Failure

- More frequent in geriatric patients, occurring in about 10 percent of people over age of 80
  - Often caused by
    - Ischemic heart disease
    - Valvular heart disease
    - Cardiomyopathy
    - Dysrhythmias
    - Hyperthyroidism
    - Anemia
Heart Failure

• Common signs and symptoms
  – Dyspnea
  – Fatigue (often first symptom of left-sided heart failure)
  – Orthopnea
  – Dry, hacking cough progressing to productive cough with frothy sputum
  – Dependent edema caused by right-sided heart failure
  – Nocturia
  – Anorexia, hepatomegaly, ascites

Heart Failure

• Emergency care is aimed at reversing conditions as soon as possible
  – Help prevent cardiac damage
  – Oxygen administration and ECG monitoring
  – Intubation
  – IV therapy
  – Drug therapy
    • Nitroglycerin
    • Morphine
    • Furosemide

How do furosemide, nitroglycerin, and morphine work to relieve the signs and symptoms of heart failure?
Dysrhythmias

- Common cause of dysrhythmias is hypertensive heart disease
  - Any condition that decreases blood flow to heart can cause rhythm irregularities
  - When assessing dysrhythmias, paramedic should consider
    - Premature ventricular contractions are common in most adults over 80 years of age
    - Atrial fibrillation is most common dysrhythmia
    - Dysrhythmias may result from electrolyte imbalances

Dysrhythmias

- Associated complications may include
  - Traumatic injury from falls that result from cerebral hypoperfusion
  - Transient ischemic attacks
  - Heart failure
- Emergency care
  - Ensure adequate airway, ventilatory, and circulatory support
  - Administer oxygen
  - Transport

Abdominal and Thoracic Aneurysm

- Common cause of abdominal and thoracic aneurysm
  - Abdominal aortic aneurysm affects about 2 to 4 percent of U.S. population in men over 50 years of age
  - Acute dissecting aortic aneurysm is more common than abdominal aneurysm and associated with high mortality rate
  - Signs and symptoms vary according to site of rupture or extent of dissection
Abdominal and Thoracic Aneurysm

• Goals of prehospital care are relief of pain and immediate transport
  – Airway, ventilatory, and circulatory support may be required if the patient’s condition deteriorates
  – Other prehospital care measures
    • Gentle handling of patient
    • Allaying anxiety
    • High-concentration oxygen administration
    • Small-bore IV access to restrict fluids unless severe hypotension is present
    • Pain medication per medical direction

Hypertension

• Geriatric patients who have atherosclerosis also frequently have hypertension
  – Associated risk factors
    • Advanced age
    • Diabetes
    • Obesity

Hypertension

• Often defined as resting BP consistently higher than 140/90 mm Hg
  – Chronic hypertension is associated with many medical conditions
    • Aneurysm formation
    • Blindness
    • Cardiac hypertrophy and left ventricular failure
    • Kidney failure
    • Myocardial ischemia and infarction
    • Peripheral vascular disease
    • Stroke
Hypertension

• May manifest only in nonspecific complaints such as
  – Headache
  – Forgetfulness
  – General malaise
• Other signs and symptoms
  – Epistaxis
  – Tremors
  – Nausea and vomiting

Hypertension

• Emergency care is mainly supportive
  – In severe cases, medical direction may advise to use
• After physician evaluation, often managed with
  – Oral medications
  – Dietary sodium reduction
  – Weight loss
  – Exercise

Cerebral Vascular Disease

• Stroke is third leading cause of death in most countries and leading cause of brain injury in adults
  – Neurological impairment is caused by ischemic or hemorrhagic interruption in blood supply to brain
  – Associated risk factors for cerebral vascular disease
    • Smoking
    • Hypertension
    • Diabetes
    • Atherosclerosis
    • Hyperlipidemia
    • Polycythemia
    • Heart disease
Cerebral Vascular Disease

- Once paramedic suspects stroke, minimize time in field because limited time to initiate therapy
  - In many cases, less than 3 hours from onset is recommended for fibrinolytic therapy
  - Focus on managing patient’s airway, breathing, and circulation
  - Monitor vital signs

Cerebral Vascular Disease

- Aside from supporting vital functions, most important element of prehospital care for stroke victim is identification of patient with stroke
  - Rapid transportation to stroke center that can provide treatment within 1 hour after arrival at emergency department

What factors can cause a delay between the onset of signs and symptoms of stroke in the geriatric patient and when an emergency phone call is made?
Delirium

- Abrupt disorientation to time and place
  - Usually includes illusions and hallucinations
    - Patient’s mind may “wander”
    - Speech may be incoherent
    - Patient may be in state of mental confusion or excitement
  - Commonly is result of physical illness

Delirium

- Signs and symptoms vary according to
  - Personality
  - Environment
  - Severity of illness
- Causes are associated with organic brain dysfunction
  - Physical vs. psychological disorders that affect cognition

Delirium

- Examples of disorders and risk factors
  - Alcohol intoxication or withdrawal
  - Anticholinergic medications
  - Cardiovascular disease
  - Dehydration
  - Depression
  - Drug reactions
  - Environmental emergencies
Delirium

- Examples of disorders and risk factors
  - Fever
  - Hyper/hypoglycemia
  - Malnutrition
  - Metabolic disorders
  - Psychiatric disorders
  - Tumor
  - Urinary tract infection/bowel obstruction
  - Vitamin deficiencies
  - Withdrawal from sedatives

Delirium

- Delirium can be life threatening
  - Requires emergency care
  - Condition may be reversible if diagnosed early
  - Can progress to chronic mental dysfunction

Delirium

- Prehospital care
  - Ensure adequate airway, breathing, circulatory support
    - Manage hypoxia with oxygen
    - Manage hypotension with IV fluids if appropriate
  - Reduce agitation and anxiety
  - Avoid patient injury, ensure personal safety
    - Restrain patient if needed, per protocol
    - Sedate patient as last resort
Delirium

- Prehospital care
  - Consider hypoglycemia or narcotic state
    - Measure blood glucose level
    - Administer dextrose 50 percent or naloxone per protocol
  - Assess for CNS injury (e.g., trauma or stroke)
    - Perform careful neurological examination
  - Look for signs of CNS infection (e.g., encephalitis)
  - Transport patient for physician evaluation

Dementia

- Slow, progressive loss of awareness of time and place
  - Usually involves inability to learn new things or recall recent events
  - Often is result of brain disease caused by
    - Strokes
    - Genetic or viral factors
    - Alzheimer's disease

- Generally is considered irreversible
  - Eventually results in full dependence on others as result of progressive loss of cognitive functioning
  - During course of disease, patients often try to "cover up" their memory loss by confabulation (making up stories to fill gaps in memory)
Dementia

• Sudden outbursts or embarrassing conduct may be first clear signs of dementia
  – Some patients eventually regress to “second childhood”
    • Need full care for feedings, toileting, physical activity
  – Dementia is present in about 30 to 50 percent of persons over 85 years of age

Dementia

• Sudden outbursts or embarrassing conduct may be first clear signs of dementia
  – Possible causes
    • Alzheimer’s disease
    • Brain trauma
    • Brain tumor
    • Drug toxicity
    • Huntington’s chorea
    • Infections
    • Major depression
    • Parkinson’s disease
    • Metabolic and endocrine disorders
    • Multi-infarct dementia
    • Psychiatric disorders

Dementia

• Can be difficult to differentiate from delirium in prehospital setting
  – Key difference between the two is that
    • Delirium is new with rapid onset
    • Dementia is progressive
  – History of event from reliable witness (e.g., friend or family member) is best source of information
    • History provided by patient may be unreliable
    • If good witness is not available, manage patient for delirium that may be life-threatening emergency
Alzheimer’s Disease

• Condition in which nerve cells in cerebral cortex die and brain substance shrinks
  – Disease is single most common cause of dementia and is responsible for majority of cases in persons over 65 years of age
  – Does not cause death directly
    • Patients ultimately stop eating and become malnourished and immobilized
    • Prone to intercurrent infections

Alzheimer’s Disease

• Exact cause is not known
  – Possible causes
    • Abnormalities in glutamate metabolism
    • Chronic infection
    • Toxic poisoning by metals
    • Reduction in brain chemicals (e.g., acetylcholine)
    • Genetics
  – Atherosclerosis is not cause
    • Primary disorder is in nerve cells, not blood vessels

Alzheimer’s Disease

• Early symptoms of Alzheimer’s disease mainly are related to memory loss, especially ability to make and recall new memories
  – As disease progresses, agitation, violence, impairment of abstract thinking occur
  – Judgment and cognitive abilities begin to interfere with work and social relations
  – In advanced stages, patients often become bedridden and totally unaware of their surroundings
    • Once bedridden, pressure ulcers (bed sores), feeding problems, and pneumonia shorten patient’s life
Alzheimer’s Disease

• No specific treatment exists
  – Some medications such as cholinesterase inhibitors, antipsychotics, and antidepressants may help delay disease and lessen associated symptoms
  – Treatment primarily consists of nursing and social care for patient and relatives
  – Paramedic manages patients same as for dementia

Parkinson’s Disease

• Brain disorder caused by degeneration of or damage to nerve cells in basal ganglia
  – Causes muscle tremor, stiffness, weakness
  – Characteristic signs
    • Resting tremors and shaking (usually beginning in one hand, arm, or leg)
    • Rigid posture and muscle stiffness
    • Slow movements
    • Shuffling, unbalanced walk, which increases Parkinson’s patient’s risk for falls

Parkinson’s Disease

• Signs and symptoms
  – Difficulty swallowing and chewing
  – Impaired speech
  – Impaired cognitive function
  – Urinary problems
  – Excessive sweating
  – Depression
  – Sleep difficulties
  – Mask-like facial expression
Parkinson’s Disease

• If left untreated, disease progresses over 10 to 15 years to severe weakness and incapacity
  – 1 in 100 Americans over age 60 is afflicted with Parkinson’s
    • 50,000 new cases diagnosed in U.S. each year

Parkinson’s Disease

• Emergency care mainly is supportive
  – Airway, ventilatory, and circulatory support
  – Transport for physician evaluation
  – Has no cure
  – Counseling, exercise, special aids in home, and drug therapy can improve patient’s morale, mobility, and quality of life

Endocrine System

• Two common endocrine disorders often are seen in geriatric patients
  – Type 2 diabetes
  – Thyroid disease
Type 2 Diabetes

- About 20 percent of older adults have diabetes
  - Almost 40 percent have some impaired glucose tolerance
  - Most common in geriatric patients, especially when person is overweight
  - Associated risk factors in older adults for complications related to diabetes
    - Decreased ability to care for self
    - Living alone
    - Concurrent illness
    - Decline in renal function
    - Polydrug use

Type 2 Diabetes

- To control, combination of
  - Dietary measures
  - Weight reduction
  - Oral hypoglycemic agents

Type 2 Diabetes

- In most cases, insulin injections are not required for type 2 diabetes
  - If not controlled, diabetes can lead to complications
    - Retinopathy (inflammatory eye disorders)
    - Peripheral neuropathy (ulcers on feet are common)
    - Autonomic neuropathy (causes GI, GU, CV symptoms and sexual dysfunction, kidney damage)
Type 2 Diabetes

- Diabetic patients also have higher-than-average risk for
  - Atherosclerosis
  - Hypertension
  - Other cardiovascular disorders
  - Cataracts

Type 2 Diabetes

- Emergency care
  - Airway, ventilatory, and circulatory support
  - Blood glucose screening
  - IV dextrose (if indicated and in absence of cerebral damage)
  - Transport for physician evaluation

Type 2 Diabetes

- Hyperglycemic hyperosmolar nonketotic syndrome (HHNS) is serious complication of elderly type 2 diabetic patients
  - Mortality rate of 20 to 50 percent
  - Paramedic often finds type 2 diabetic patient comatose
    - If awake, patient may complain of profound thirst and frequent urination
    - Frequent urination results from osmotic diuresis and leads to dehydration and electrolyte loss
Type 2 Diabetes

• Predisposing factors that make geriatric patients susceptible HHNS
  – Infection
  – Noncompliance with medications
  – Polydrug use
  – Pancreatitis
  – Stroke
  – Hypothermia
  – Heat stroke
  – MI

Type 2 Diabetes

• If HHNS is suspected
  – Ensure adequate airway, ventilatory, and circulatory support
  – Search vigorously for underlying cause
  – Initiate IV therapy to manage dehydration
  – Rapidly transport

What prehospital assessment finding is present in the patient with diabetic ketoacidosis yet is absent in the patient with hyperglycemic hyperosmolar nonketotic coma?
Thyroid Disease

• Common in geriatric patients
  — May be related to aging process
  — Classic signs and symptoms of thyroid disorders often are not present
    • Suspect thyroid dysfunction in any geriatric patient who is ill

Thyroid Disease

• Hypothyroidism
  — Results from destruction of thyroid tissue over time
  — Leads to insufficient amount of thyroid hormone in blood
  — Often attributes signs and symptoms of hypothyroidism to “growing old”
  — Common complaints
    • Nonspecific musculoskeletal complaints
    • Confusion

Thyroid Disease

• Hypothyroidism
  — More serious associated conditions
    • CHF
    • Anemia
    • Hyponatremia
    • Depression
    • Dementia
    • Seizures
    • Coma
Thyroid Disease

- Other signs and symptoms associated with hypothyroidism
  - Cold intolerance
  - Fatigue
  - Weight gain
  - Poor cognitive function
  - Scaly dry skin and hair loss
  - Peripheral and facial edema
  - Paranoia

- Hyperthyroidism is less common than hypothyroidism in elderly patients
  - May result from medication errors
  - Signs and symptoms
    - Weight loss
    - Constipation
    - Mental status changes
    - CHF
    - Tachydysrhythmias
    - Lethargy

- Emergency care mainly is supportive to ensure vital functions
- Definitive care
  - Thyroid drugs
  - Radioactive iodine treatments
  - Sometimes surgery
Thyroid Disease

- Severe complications
  - Thyroid storm
  - Myxedema coma
    - Can be made worse in patient who has coronary artery disease

Gastrointestinal System

- GI emergencies are common in elderly
  - Always consider abdominal pain serious complaint in geriatric patient
  - Life-threatening causes of abdominal pain
    - Abdominal aortic aneurysm
    - GI hemorrhage
    - Ruptured viscus
    - Dead or ischemic bowel
    - Acute bowel obstruction

Gastrointestinal System

- GI bleeding most commonly affects patients between 60 and 90 years of age
  - Possible causes
    - Peptic ulcer disease
    - Esophageal varies
    - Stomach and esophageal cancer
    - Diverticulitis
    - Bowel obstruction
    - Cirrhosis of liver
  - Has mortality rate of about 10 percent
Gastrointestinal Hemorrhage

• The older the patient, higher the risk of death
  – Higher risk is because of following
    • Geriatric patients are less able to compensate for acute blood loss
    • Less likely to feel symptoms and therefore seek treatment at later stages of disease
    • More likely to be taking aspirin or nonsteroidal anti-inflammatory drugs, which places them at higher risk for ulcer disease and bleeding
    • Higher risk for colon cancer, intestinal vascular abnormalities, diverticulitis
    • More likely to be taking anticoagulants such as warfarin

Gastrointestinal Hemorrhage

• Signs and symptoms
  – Vomiting of blood or coffee-ground emesis
  – Blood-tinged or black, tarry stools
  – Agitation
  – Weakness
  – Syncope
  – Pain
  – Jaundice
  – Constipation or diarrhea

Gastrointestinal Hemorrhage

• If paramedic suspects or confirms bleeding with signs and symptoms of shock
  – Begin measures to ensure adequate airway, ventilatory, and circulatory support
  – Transport rapidly for definitive care
Bowel Obstruction

- Generally occurs in patients with prior abdominal surgeries or hernias
  - Obstruction occurs in those with colonic cancer
  - Most complain of
    - Constipation
    - Abdominal cramping
    - Inability to pass gas
    - Protracted vomiting of food or bile and vomiting of fecal material
  - Patient’s heart rate and BP often are in normal ranges
  - Abdomen also may be mildly distended and tender in all four quadrants (abdominal pain is variable)

Bowel Obstruction

- Prehospital care mainly is supportive to ensure vital functions
  - After physician evaluation, patient care may include
    - Bowel rest
    - Nasogastric suction
    - Volume replacement
  - Some patients may need surgery to lyse offending adhesions
    - May result in cycle of new scarring and obstruction
    - Also may need surgery for hernia repair (most often in men)

Problems with Continence

- Continence is ability to control bladder or bowel function
  - Requires
    - Anatomically correct GI and genitourinary tracts
    - Competent sphincter mechanisms
    - Cognitive and physical function
    - Motivation
Problems with Continence

• Some factors associated with continence are affected by age
  – Decrease in bladder capacity
  – Involuntary bladder contractions
  – Decreased ability to postpone voiding
  – Medications that can affect bladder and bowel control
• Incontinence of urine or bowel is abnormal at any age

Problems with Continence

• Urinary incontinence can vary in severity
  – Can be only mild incontinence (escape of small amounts of urine)
  – Can be total incontinence, with complete loss of bladder control

Problems with Continence

• Urinary incontinence can vary in severity
  – Causes
    • Injury or disease of urinary tract
    • Prolapse of uterus
    • Decline in sphincter muscle control surrounding urethra (common in elderly)
    • CNS injury or disease
    • Pelvic fracture
    • Prostate cancer
    • Dementia
Problems with Continence

• Bowel incontinence in geriatric patient usually is result of fecal impaction
  – Occurs when feces lodged in rectum irritate and inflame lining
  – Allows fecal fluid and small feces to pass involuntarily
  – Other causes
    • Severe diarrhea
    • Injury to anal muscles (from childbirth or surgery)
    • CNS injury or disease
    • Dementia

Problems with Continence

• All forms of incontinence usually are embarrassing for patient
  – If incontinence is chronic
    • Can lead to skin irritation
    • Tissue breakdown
    • Urinary tract infection
  – Some cases are managed with surgery to restore sphincter function
    • Patients with mild cases often wear absorptive undergarments to relieve discomfort and embarrassment

Consider the incontinent patient. How can you minimize the patient’s embarrassment and discomfort?
Problems with Elimination

- Causes of difficulty in urination usually result from
  - Enlargement of prostate (in men)
  - Urinary tract infection
  - Urethral strictures
  - Acute or chronic renal failure

Problems with Elimination

- Difficulty in bowel elimination often associated with
  - Diverticular disease
  - Constipation
  - Colorectal cancer
- Problems with elimination can cause great pain and anxiety for geriatric patients
  - Take their complaints seriously
  - Conditions call for physician evaluation to identify cause and to select appropriate therapy

Integumentary System

- As persons age, skin gradually becomes dry, transparent, wrinkled
  - These integumentary changes are associated with
    - Loss of elasticity
    - Uneven pigmentation
    - Various benign and malignant lesions
Integumentary System

• As persons age, skin gradually becomes dry, transparent, wrinkled
  – Aging results in gradual decrease in epidermal cellular turnover and reduced rate of nail and hair growth
  – Associated loss of deep, dermal vessels and capillary circulation leads to common complaints such as
    • Dry, itchy skin
    • Changes in thermal regulation
    • Skin-related complications

Integumentary System

• Complications include
  – Slow healing
  – Increased risk of secondary infection
  – Increased risk of fungal or viral infections
  – Increased susceptibility to abrasions and tears

Integumentary System

• Always be gentle with skin of a geriatric patient
  – Use of aseptic technique during wound management
  – Gentle placement and removal of ECG electrodes
  – Using careful taping procedures when securing IV catheters or tubing
Consider a geriatric patient who has a burn injury. How do these changes influence the patient’s recovery?

Pressure Ulcers

- Pressure ulcers are common
  - Often develop on skin of patients who are bedridden or immobile (e.g., decubitus ulcers)
  - Most occur in lower legs, back, buttocks, and on bony areas such as greater trochanter or sacrum
  - Often affect victims of brain or spinal cord injury, stroke, or other illnesses that result in loss or change in sensation of pain

Pressure Ulcers

- Factors for developing pressure ulcers
  - Skin exposure to moisture
  - Poor nutrition
  - Friction or shear
  - Vascular and metabolic disorders
  - Trauma
  - Cancer
Pressure Ulcers

- Result from tissue hypoxia
  - Generally start as red, painful areas that become purple before skin breaks down
  - Develop into open sores
  - Once integrity of skin has been breached, sores often become infected
  - Slow to heal
  - Pressure ulcers should be covered with sterile dressing using aseptic technique
  - Transport for physician evaluation and wound care to facilitate healing

Osteoarthritis

- Common form of inflammatory arthritis in geriatric patients
  - Degenerative condition that results from cartilage loss and wear and tear on joints
  - Condition leads to pain, stiffness, and sometimes loss of function of affected joint
  - Often affected joint becomes large and distorted from outgrowths of new bone (osteoophytes) that tend to develop at margins of joint surface
Osteoarthritis

• Evolves in middle years
  – Occurs to some extent in almost all persons over 60 years of age
  – Some persons have no symptoms
  – After physician evaluation, treatment may include
    • Medications
    • Physical therapy
    • Sometimes joint replacement surgery

Osteoarthritis

• Newer drugs relieve inflammation and pain associated with arthritis
  – Have less risk of causing stomach irritation than traditional medications
  • Example of newer drugs is celecoxib (Celebrex)
Osteoporosis

• Disease that decreases bone density
  – It is natural part of aging and is especially common in older women after menopause
    • Because of decrease in estrogen hormone that helps maintain bone mass

Osteoporosis

• Present in most persons by 70 years of age, by which time density of skeleton has diminished by 1/3
• Most persons with osteoporosis have some degree of kyphosis
• Risk factors that may affect progression of disease
  – Genetics
  – Smoking
  – Exercise habits
  – Diets poor in calcium and vitamin D

Osteoporosis

• Loss of bone density causes bones to become brittle
  – Can fracture easily, which often is first sign of osteoporosis
  – Typical sites for fractures
    • Just above wrist
    • Head of femur
    • One of several vertebrae (often spontaneous fracture)
Osteoporosis

• Treated with preventive measures
  – Diet high in calcium
  – Calcium supplements
  – Exercise
  – Hormone replacement therapy after menopause  
    (controversial)

Problems with Vision

• Vision changes begin to occur at around 40 years of age
  – Gradually increase over time
  – Can severely limit daily activities
    • Can lead to a loss of independence

Problems with Vision

• Effects of aging on vision
  – Reading difficulties
  – Poor depth perception
  – Poor adjustment of eyes to variations in distance
  – Altered color perception
  – Sensitivity to light
  – Decreased visual acuity
Problems with Vision

• Two common eye conditions that develop with age are cataracts and glaucoma
  – Cataract is loss of transparency of lens of eye
    • Results from changes in delicate protein fibers within lens
    • Cataract never causes full blindness
    • Clarity and detail of image progressively are lost

Problems with Vision

• Cataracts usually occur in both eyes
  – In most cases, though, one eye is affected more severely than other
  – Almost everyone over 65 years of age has some degree of cataract
  – Most persons over 75 years of age have minor visual deterioration from disorder
  – Surgery to remove cataract is common procedure in U.S.
Problems with Vision

• Glaucoma
  – Condition in which intraocular pressure increases
  – Pressure causes damage to optic nerve
  – Result is nerve fiber destruction and partial or full loss of peripheral and central vision
  – Glaucoma may result from
    • Aging (rarely seen before 40 years of age)
    • Congenital abnormality
    • Trauma to eye

Problems with Vision

• Glaucoma is most common major eye disorder in persons over 60 years of age and is leading cause of preventable blindness in U.S.
  – Symptoms of acute glaucoma
    • Dull, severe, aching pain in and around eye
    • Fogginess of vision
    • Perception of "rainbow rings" (halos) around lights at night
  – Testing is part of most eye examinations in adults
  – If detected early, condition can be treated with oral medications and eye drops to relieve pressure

Consider the patient who has glaucoma. What prehospital cardiac medication should not be given to this patient?
Problems with Hearing

- Not all geriatric patients have hearing loss
  - Overall hearing tends to decrease with age
  - Results from degeneration of hearing mechanism (sensorineural deafness)
- Causes
  - Meniere's disease (increased fluid pressure in labyrinth)
  - Certain drugs
  - Tumors
  - Some viral infections

Problems with Hearing

- Can interfere with the ability to perceive speech
  - Can limit ability to communicate
  - Hearing aid devices and surgical implants sometimes can restore or improve hearing
Problems with Hearing

- **Tinnitus**
  - Perception of noise in ear (e.g., ringing, buzzing, or whistling)
  - Can occur as symptom of many ear disorders
  - Noise in ear sometimes may change in nature and intensity
    - In most cases is present at all times with intermittent awareness by person
  - Almost always associated with hearing loss, especially hearing loss that develops from aging

What common analgesic, when taken in excess, can cause tinnitus?

Problems with Speech

- Speech is most often used method of communication
  - Common problems with speech often are associated with
    - Difficulty in word retrieval
    - Decreased fluency of speech
    - Slowed rate of speech
    - Changes in voice quality
Problems with Speech

- Disorders may occur from
  - Damage to language centers of brain (usually as result of stroke, head injury, brain tumor)
  - Degenerative changes in nervous system
  - Hearing loss
  - Disorders of larynx
  - Poor-fitting dentures

Toxicology

- Geriatric patients are at increased risk for adverse drug reactions
  - Result of age-related changes in
    - Body composition
    - Drug absorption
    - Distribution
    - Metabolism
    - Excretion

Toxicology

- Age-related changes that affect absorption include increased gastric pH and decreased gastrointestinal motility
  - Both may increase or decrease absorption of various drugs (depending on chemical properties of drug)
  - Drug distribution may be affected by
    - Decreased cardiac output (e.g., as seen in CHF)
    - Total body water
    - Changes in ratio of lean mass to fat
    - Increased body fat
Toxicology

- Metabolic changes may result from
  - Decreased liver blood flow
  - Diseases such as thyroid disease, CHF, and cancer
  - Smoking
  - Drug interactions
- Renal function decreases with age in majority of adults

Toxicology

- Can lead to accumulation of drugs that normally are cleared through renal system
  - In addition, action of drugs affecting CNS and cardiovascular system often is altered in older adults
  - Because of these changes, drugs may not produce desired effect or may cause major drug toxicity in older adults

Toxicology

- Drugs that commonly cause toxicity in geriatric patients
  - Analgesics
  - Angiotensin-converting enzyme inhibitors
  - Antidepressants
  - Antihypertensives
  - Beta-blockers
  - Digitalis
  - Diuretics
  - Psychotropics
Toxicology

• Adverse reactions associated with these and other drugs often result from "accidents" or "mishaps" in prescribed drug regimen
  – Other common reasons for drug-induced illness in geriatric patient
    • Dispensing errors
    • Noncompliance
    • Confusion
    • Forgetfulness
    • Vision impairment
    • Self-selection of drugs

Toxicology

• Older adults commonly
  – Have several prescriptions from more than one physician
  – Improperly resume old medication in addition to newly prescribed one
  – Take prescribed medications along with over-the-counter drugs that may have synergistic or cumulative effects

Toxicology

• Changes in habits regarding alcohol, diet, and exercise also can affect drug metabolism
  – Can increase risk for adverse drug reactions
  – Emergency care varies
    • Care may range from transport only to full advanced cardiac life support measures
Substance Abuse

• Substance abuse involving alcohol and other drugs is common in elderly population
  – Up to 17 percent of U.S. citizens over age 60 are estimated to be addicted to substances
  – Expected to rise as baby boomer population enters older age

Substance Abuse

• Substance abuse is attributed to severe stress as primary risk factor
  – Age-related changes in health or appearance
  – Loss of employment
  – Loss of spouse or life partner
  – Illness
  – Malnutrition
  – Loneliness
  – Loss of independent living arrangements

Substance Abuse

• If paramedic suspects substance abuse, friends and family members at scene should be discretely interviewed about patient’s alcohol or other drug use
  – Cornerstones of therapy are identifying the problem and arranging referral to physician for treatment
  – Treatment for acutely intoxicated patient is may include resuscitative measures to manage patient’s airway, ventilation, circulation
Substance Abuse

• Carefully assess geriatric patient who has signs and symptoms of alcohol or other drug intoxication for occult trauma and any underlying medical conditions
  – Hypoglycemia
  – Cardiomyopathy and dysrhythmias (such as atrial fibrillation)
  – GI bleeding
  – Polydrug use (especially barbiturates and tranquilizers)
  – Ethylene glycol or methanol ingestion

Environmental Considerations

• Elderly patients are at risk for developing illness from extremes in environment
  – Result of aging process and other factors
  – Two emergencies that relate to environment are most common in geriatric patients
    • Hypothermia
    • Hyperthermia

Hypothermia

• Patients who are younger often develop hypothermia from extremes in environment
  – Older patient may develop hypothermia while indoors
  – May occur as result of cold surroundings and/or an illness that alters heat production or conservation
Hypothermia

• Patients who are younger often develop hypothermia from extremes in environment
  – Due in part to following characteristics of older adults
  • Less able to make up for environmental heat loss
  • Have decreased ability to sense changes in temperature
  • Have less total body water to store heat
  • Less likely to develop tachycardia to increase cardiac output in response to cold stress
  • Have decreased ability to shiver to increase body heat

Hypothermia

• More prone to develop hypothermia as result of socioeconomic factors
  – Fixed income may inhibit older person from paying for cost of properly heating and insulating home
  – Poor nutrition that results in decrease in fat stores may contribute to hypothermia in geriatric patients who live alone

Hypothermia

• Medical causes of hypothermia in geriatric patients
  – Arthritis
  – Drug overdose
  – Hepatic failure
  – Hypoglycemia
  – Infection
  – Parkinson's disease
  – Stroke
  – Thyroid disease
  – Uremia
Hypothermia

• Signs and symptoms
  – Altered mental state
  – Slurred speech
  – Ataxia
  – Dysrhythmias
  – Coma without signs of life

Hypothermia

• Hypothermia in geriatric patient carries a high mortality rate
  – Rapid and gentle transport for in-hospital rewarming and life support measures is crucial for patient’s survival

Hyperthermia

• Less common than hypothermia
  – Carries significant mortality rate
  – Most likely results from exposure to high temperatures
  – Most likely continue for several days (e.g., during a heat wave)
  – Geriatric patients are unable to control body temperature even in moderate heat
Hyperthermia

• May result from medical conditions such as
  – Hypothalamic dysfunction
  – Spinal cord injury
• Certain medications can lead to hyperthermia
• Inhibits heat dissipation, increasing motor activity, and impairing cardiovascular function

Hyperthermia

• Hyperthermic illness may present as heat cramps, heat exhaustion, or heat stroke
• Emergency care
  – Removing patient from warm environment
  – Cooling patient
  – Ensuring patient’s vital functions through airway, ventilatory, and circulatory support
  – Rapid transport for physician evaluation is indicated to manage problems resulting from serious heat-related illness

Behavioral and Psychiatric Disorders

• 15 million elderly persons are expected to suffer from some kind of psychiatric illness by the year 2030
  – In addition to neurological disorders such as dementia and Alzheimer’s disease, depression and suicide are common in geriatric patients
Depression

• Depression is serious illness that requires physician evaluation
  – In geriatric patient, depression can result from physiological and psychological causes
  – Examples
    • Cognitive disorders with physical causes (e.g., dementia)
    • Various personality disorders such as schizophrenia
    • Signs and symptoms of depression vary by individual

Depression

• Signs and symptoms
  – Decreased libido
  – Deep feelings of worthlessness and guilt
  – Extreme isolation
  – Feelings of hopelessness
  – Irritability
  – Loss of appetite
  – Loss of energy (fatigue)
  – Recurrent thoughts of death
  – Significant weight loss
  – Sleeplessness
  – Suicide attempts

What endocrine disorder can produce signs or symptoms that are similar to those of depression?
Depression

- Major goal of care is to identify patient who may be depressed
  - Patients need to be evaluated by physician
    - Will rule out medical illness, especially thyroid disease, stroke, malignancy, and dementia; medication that may be responsible for depression
  - Try to establish rapport with patient
    - Should be encouraged to talk openly about feelings, especially any thoughts of suicide
    - If possible, interview family about patient’s mental state and question family members about any history of depression in patient

Suicide

- Rate of completed suicides for geriatric patients is higher than that of general population
  - Most of these persons visited their primary care physician in month before suicide
  - Most were suffering from their first episode of major depression
    - Was only moderately severe, yet depressive symptoms went unrecognized and untreated
    - Be aware of increased risk for suicide when evaluating geriatric patients who are depressed

Suicide

- Clues and indicators for suicide in geriatric patient that may be obtained through patient history or observed by friends and family include
  - Talking about or seemingly preoccupied with death and “getting affairs in order”
  - Giving away prized possessions
  - Taking unnecessary risks
  - Increased use of alcohol or other drugs
  - Nonadherence to medical regimen
  - Acquiring weapon, especially firearms
Suicide

• No evidence that questions about suicidal thoughts and feelings increase risk of suicide
  – Many depressed persons are willing to discuss their suicidal thoughts
  – Question patient about suicidal thoughts if he or she suspects the patient is at high risk
  – Following questions are appropriate for paramedic to ask patient
    • Do you have thoughts about killing yourself?
    • Have you ever tried to kill yourself?
    • Have you thought about how you might kill yourself?

• Most suicides committed by older adults involve firearms
  – Safety of those at scene and EMS crew is priority when caring for patient with suicidal tendencies
  – When indicated, law enforcement personnel should be available at scene
  – After assessing risk for suicidal tendencies, patient should be transported for physician evaluation
  – While en route to hospital, paramedic should encourage patient to discuss feelings and reassure patient that he or she can be helped through crisis

Trauma

• Trauma is fifth leading cause of death for persons over 65 years of age
  – 1/3 of traumatic deaths in persons 65 to 74 years of age are caused by vehicular trauma
  – 25 percent result from falls
  – In those over 72 years of age, falls is leading cause of unintentional injury death
  – Burns are major cause of disability and death in geriatric patients
Trauma
• Contributing factors that increase the severity of traumatic injury in geriatric patients
  – Osteoporosis and muscle weakness that increase the likelihood of falls and fractures
  – Reduced cardiac reserve that decreases the ability to compensate for blood loss
  – Decreased respiratory function that increases the likelihood of adult respiratory distress syndrome
  – Impaired renal function that decreases the ability to adapt to fluid shifts

Vehicular Trauma
• 15+ million licensed drivers are over 65 years of age
  – In 2008, 2,700+ deaths in this age group were attributed to motor vehicle crashes
  – Most are not related to high speed or alcohol
    • Related to errors in perception or judgment or to delayed reaction time
    • Large number of older adults are injured as drivers or passengers in moving vehicles
    • More than 2,000 pedestrian fatalities among older adults occur each year in U.S.
    • Accounts for 20 percent of all pedestrian deaths from trauma

Vehicular Trauma
• Risk of death from multiple trauma is estimated to be three times greater at 70 years of age than at 20 years of age
  – Geriatric patient is more susceptible to serious injury from equivalent degrees of trauma
  – Patient also is less capable of an appropriate, protective physiological response
  – Prompt identification of injuries and sources of hemorrhage is critical
   • Geriatric patient has much less cardiac reserve
   • Patient will succumb more quickly to shock
Head Trauma

- Head injury with loss of consciousness in geriatric patients often has poor outcome
  - Brain becomes smaller in size with age (cerebral atrophy)
  - Atrophy produces increase in distance between surface of brain and skull
  - As veins are stretched across this space, more easily are torn
    - Results in subdural hematomata
    - Extra space within skull often allows large amount of bleeding to occur before signs and symptoms of increased intracranial pressure are seen

Consider geriatric patients with head trauma. What home medications also can lead to an increased risk of intracerebral bleeding in these patients?

Head Trauma

- Geriatric patients are at high risk for injuries of cervical spine because of arthritic and degenerative changes associated with aging
  - Structural changes lead to increased stiffening and decreased flexibility of spine with narrowing of spinal canal
    - Makes spinal cord much more at risk for damage from fairly minor trauma
Chest Injuries

• Any mechanism of injury that produces thoracic trauma in geriatric patient can be potentially lethal
  – Aged thorax is less elastic
    • More susceptible to injury
  – Pulmonary system also has marginal reserve because of
    • Reduced alveolar surface area
    • Decreased patency of small airways
    • Diminished chemoreceptor response

Chest Injuries

• Injuries to heart, aorta, and major vessels are greater risk to geriatric patients
• Due to decreased functional reserve in older patients
  – Anatomical changes make injury in these areas of greater significance
    • Myocardial contusion may be complication of blunt injury to chest
    • If severe, myocardial contusion may result in pump failure or life-threatening dysrhythmias
    • Rarely, cardiac tamponade occurs after blunt thoracic trauma

Chest Injuries

• Cardiac rupture, valvular injury (e.g., flail valves), and aortic dissection also may occur with significant blunt chest injury
  – First two entities are rare but rapidly fatal
  – When mechanism of injury produces rapid deceleration, paramedic should always consider possibility of dissecting aortic aneurysm
  – Aortic dissections often are not immediately fatal
  – Proper evaluation and treatment can be lifesaving
Consider the patient who has a dissecting aortic aneurysm. What specific signs and symptoms may the paramedic see in this patient?

Chest Injuries

- In geriatric patients, the heart cannot respond as effectively to increased demand for oxygen as in younger people
  - This coupled with slowed conduction system may cause ischemia and dysrhythmias when geriatric patients have significant trauma
  - These problems may occur even if heart has not been damaged directly by trauma
  - Oxygenation and circulatory status must be closely monitored

Abdominal Injuries

- Abdominal injuries in geriatric patients have more serious consequences than injuries to any other body area
  - Often are less obvious
  - Call for a high degree of suspicion
  - Geriatric patient is less likely to tolerate abdominal surgery well
    - More likely to develop pulmonary complications and infection following surgery
Musculoskeletal Injuries

- Osteoporotic bones of geriatric patients are more at risk for fractures, even with mild trauma
  - Pelvic fractures are highly lethal in this age group
  - Can cause severe hemorrhage and soft tissue injury
  - When assessing for skeletal trauma, recall that geriatric patient may have decreased pain perception
  - Often these patients have amazingly little tenderness with major fractures

Musculoskeletal Injuries

- Even with proper care, mortality rate for geriatric patients with musculoskeletal injury is increased by delayed complications
  - Adult respiratory distress syndrome
  - Sepsis
  - Renal failure
  - Pulmonary embolism

Falls

- Falls are major cause of morbidity and mortality in older adults, with overall fatality rate of 7.0 percent
  - About 1/3 of older adults living at home fall each year
  - 1 in 40 of these persons is hospitalized
  - Major cause of falls in older adults results from use of prescribed sedative-hypnotics
    - Affect balance and postural control
    - Alprazolam
    - Diazepam
    - Chlordiazepoxide
    - Flurazepam
Consider geriatric patients who have fallen. What common problems may contribute to an increased death rate in these patients?

**Falls**

- Fractures are most common fall-related injuries, hip being fracture that most often results in hospitalization
  - In those who survive hip fracture, most will have significant problems with walking and moving about
  - May become more dependent on others for help
  - Falls that do not result in physical injury may lead to self-imposed immobility from fear of falling again

- When immobility is strict and prolonged, result in
  - Joint contractures
  - Pressure sores
  - Urinary tract infection
  - Muscle atrophy
  - Depression
  - Functional dependency
Falls

- Assume that any fall indicates an underlying problem until proved otherwise
  - Attempts should be made to uncover any medical, psychological, and environmental factors that may have been responsible for fall
  - Patient history should include
    - Full review of all medical problems and medications
    - Precise details of fall
  - Evaluate patient’s cardiovascular, neurological, and musculoskeletal systems

Burns

- More than 1,000 older adults die from fires and burns in United States each year
  - Increased risk of morbidity and mortality from burn trauma in older adults is due to
    - Preexisting disease
    - Skin changes that result in increased burn depth, altered nutrition, decreased ability to fight infection

Burns

- Geriatric burn patients need special approaches to fluid therapy to prevent damage to kidneys
  - Patient’s fluid status will need to be assessed in initial hours after burn injury by
    - Monitoring pulse and BP
    - Striving to maintain urine output of at least 50 to 60 mL per hour
Trauma Management

• Priorities of trauma care for geriatric patients are similar to those for all trauma patients
• Give special consideration to transport strategies and geriatric patient’s cardiovascular, respiratory, and renal systems

Cardiovascular System

• Special considerations for cardiovascular problems
  – Recent or past MI contributes to risk of dysrhythmias and CHF
  – Adjustment of heart rate and stroke volume may be decreased in response to hypovolemia
  – Geriatric patients may need higher arterial pressures than younger patients for perfusion of vital organs
    • Because of atherosclerotic peripheral vascular disease

  – Rapid IV fluid administration to geriatric patients may cause volume overload
    • Take care not to overhydrate
    • Older adults as group are more susceptible to CHF
    • Hypovolemia and hypotension are also poorly tolerated
    • Consider hypovolemia in any geriatric patient whose systolic BP less than 120 mm Hg
    • Tachycardia may not occur if patient takes beta-blockers
    • Monitor lung sounds and vital signs carefully and frequently during fluid administration
Respiratory System

- Special considerations for respiratory problems
  - Physical changes decrease chest wall compliance and movement
    - Diminish vital capacity
  - PaO2 decreases with age
  - Lower Po2 at same fractional inspired oxygen concentration occurs with each passing decade
  - All organ systems have less tolerance to hypoxia

Respiratory System

- Special considerations for respiratory problems
  - COPD (common in geriatric patients) requires paramedic carefully adjust airway management and ventilation support for appropriate oxygenation and carbon dioxide removal
    - High-concentration oxygen may suppress hypoxic drive in some patients
    - Oxygen should never be withheld from patient with clinical signs of cyanosis
    - May need to remove patient’s dentures for adequate airway and ventilation management

Renal System

- Special considerations for renal problems
  - Kidneys have decreased ability to maintain normal acid-base balance
    - Have decreased ability to compensate for fluid changes
  - Kidney disease may decrease ability of kidneys to compensate
  - Decreased kidney function (along with decreased cardiac reserve) places injured geriatric patient at risk for fluid overload and pulmonary edema following IV fluid therapy
Transportation Strategies

• Special considerations for transportation of geriatric patients
  – Positioning, immobilization, and transport of a geriatric trauma patient may require modifications to accommodate physical deformities (e.g., arthritis or spinal abnormalities)
  – Packaging should include bulk and extra padding to support and give comfort to patient
  – Prevent hypothermia by keeping patient warm

Elder Abuse

• Infliction of physical pain, injury, debilitating mental anguish, unreasonable confinement, or willful deprivation by caregiver of services that are necessary to maintain mental and physical health of geriatric person
• Elder abuse has become more and more recognized as growing problem in U.S.
  – Estimated to affect between 1 and 2 million older adults each year

Elder Abuse

• Elder abuse takes many forms
  – Physical abuse
  – Sexual abuse
  – Emotional or psychological abuse
  – Neglect
  – Abandonment
  – Financial or material exploitation
  – Self-neglect
Elder Abuse

• All 50 states have elder abuse statutes
  – Reporting of suspected elder abuse is mandatory under law in most states
  – If paramedic suspects abuse or neglect of older adult, medical direction should be advised
  – Follow procedures established by local protocol
  – Emergency care is aimed at managing injuries that pose threat to life and transporting patient for physician evaluation

Summary

• Aging process proceeds at different rates in different persons
  – Respiratory function in the older adult generally is compromised
    • Result of changes in pulmonary physiology that go along with the aging process
  – Cardiac function also declines with age
    • Result of normal physiological changes and high incidence of coronary artery disease
  – Renal blood flow falls an average of 50 percent between 30 and 80 years of age

Summary

• Aging process proceeds at different rates in different persons
  – Gradual decrease in neurons, decreased cerebral blood flow, and changes in the location and amounts of specific neurotransmitters probably contribute to changes in the CNS
    – As body ages, muscles shrink, muscles and ligaments calcify, and the intervertebral disks become thin
  – Changes in body mass and total body water, a decreased ability to maintain internal homeostasis, a decrease in the function of immunological mechanisms, nutritional disorders, and decreases in hearing and visual acuity
Summary

• Normal changes with aging and existing illnesses may make evaluation of an ill or injured geriatric patient a challenge

Summary

• Pneumonia is a leading cause of death in geriatric age group
  – Often is fatal in frail adults
  – Chronic obstructive pulmonary disease (COPD) is a common finding in geriatric patient who has a history of smoking
    • Disease usually is associated with various other diseases that result in reduced expiratory airflow
  – Pulmonary embolism is a life-threatening cause of dyspnea, and is associated with venous stasis, heart failure, COPD, malignancy, and immobilization

Summary

• Lack of typical chest pain can cause MI to go unrecognized in geriatric patients
  – Heart failure is more frequent in geriatric patients and has a larger incidence of noncardiac causes
  – Most common cause of dysrhythmias in the geriatric patient is hypertensive heart disease
  – Abdominal aortic aneurysm affects 2 to 4 percent of the U.S. population over 50 years of age
    • Most prevalent between 60 and 70 years of age
  – Incidence of hypertension in the geriatric patient increases when atherosclerosis is present
Summary

• Risk factors for cerebral vascular disease in the older adult include smoking, hypertension, diabetes, atherosclerosis, hyperlipidemia, polycythemia, and heart disease
• Delirium is an abrupt disorientation of time and place
  – Commonly a result of physical illness

Summary

• Dementia is a slow, progressive loss of awareness of time and place
  – Usually involves an inability to learn new things or remember recent events
  – Often is a result of brain disease
  – Alzheimer’s disease is the most common cause of dementia
    • Condition in which nerve cells in the cerebral cortex die and brain substance shrinks

Summary

• Parkinson’s disease is a brain disorder
  – Causes muscle tremor, stiffness, and weakness
• About 20 percent of older adults have diabetes
  – Almost 40 percent have some impaired glucose tolerance
  – Hyperglycemic hyperosmolar nonketotic coma is a serious complication of elderly type 2 diabetic patients
    • Has a mortality rate of 20 to 50 percent
Summary

• Thyroid disease is more common in geriatric patients
  — It may not present in the classic manner
• Gastrointestinal bleeding most often affects patients between 60 and 90 years of age
  — Has mortality rate of about 10 percent
  — Bowel obstruction generally occurs in patients with prior abdominal surgeries or hernias; also occurs in those with colonic cancer
  — Some geriatric patients may have problems with continence or with elimination as well

Summary

• Aging results in a gradual decrease in epidermal cellular turnover
  — Also results in loss of deep and dermal vessels
  — Capillary circulation leads to changes in thermal regulation and skin-related complications

Summary

• Osteoarthritis is a common form of arthritis in geriatric patients
  — Results from cartilage loss and wear and tear on joints
  — Loss in bone density from osteoporosis causes bones to become brittle
    • Bones may fracture easily
Summary

• As persons age, they may experience problems with vision, hearing, and speech

• Geriatric patients are at an increased risk for adverse drug reactions
  – Due to age-related changes in body makeup and drug distribution
  – Also is result of metabolism and excretion
    • Risk for adverse drug reactions often stems from multiple prescribed drugs
    • Alcohol abuse is a common problem in geriatric patients

Summary

• Geriatric patient may develop hypothermia while indoors
  – May be result of cold surroundings and/or an illness that alters heat production or conservation
  – Hyperthermia most likely results from exposure to high temperatures that continue for several days

Summary

• Depression is common in geriatric patients
  – Can result from physiological and psychological causes
  – Rate of completed suicides for geriatric patients is higher than that of general population
Summary

• 1/3 of traumatic deaths in persons 65 to 74 years of age result from vehicular trauma
  – 25 percent result from falls
    • In those 80+ years of age, falls account for 50 percent of injury-related deaths
    • Risk of fatality from multiple trauma is estimated to be three times greater at 70 years of age than at 20 years of age
• Elder abuse is classified as physical abuse, psychological abuse, financial or material abuse, and neglect

Questions?