Chapter 1
Introduction to Community Paramedicine

Unit Summary

After students complete this chapter and the related course work, they will be able to define community paramedicine and describe the roles of the community paramedic, discuss the history of community paramedicine, list the members of the health care team, describe the scope of practice for the community paramedic, and discuss strategies used to build productive working relationships with members of the health care team.

Objectives

1. Define community paramedicine. (p 2)
2. Describe the scope of practice for the community paramedic. (pp 2-3, 4-6)
3. Discuss the history of community paramedicine. (pp 3-4)
4. Describe the roles of the community paramedic, including bringing primary care to the home and acting as a navigator for the patient. (pp 6-7)
5. List the members of the health care team. (pp 7-9)
6. Describe the strategies used in building productive working relationships with the members of the health care team. (p 9)

Readings and Preparation

- Review all instructional materials including ***Community Health Paramedicine***, Chapter 1, and all related presentation support materials.
- Review local protocols relating to community paramedicine and the scope of practice and roles of the community paramedic, including bringing primary care to the home and acting as a navigator for the patient.

Support Materials

- Lecture PowerPoint presentation

Enhancements

- Direct students to visit Navigate 2.
- Provide copies of local protocols.

Unit Activities

Writing assignments: Instruct each student to put together a scenario to illustrate some strategies used to build effective working relationships with members of the health care team.

Student presentations: Divide students into groups. Instruct each group to act out the strategies used to build effective working relationships with members of the health care team (developed for the writing assignment) and to act out the roles of the community paramedic for the rest of the class.

Group activities: Discuss and critique each student presentation as a group. Discuss problems regarding the scope of practice for community paramedicine, the roles of the community paramedic, the members of the health care team, and what can hinder building productive working relationships with members of the health care team.

Pre-Lecture

You are the Community Paramedic

"You are the Community Paramedic" is an opening case study that encourages critical thinking skills.

Instructor Directions

1. Direct students to read the "You are the Community Paramedic" scenario found at the beginning of Chapter 1.
2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question.
3. You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. Community paramedicine

1. New concept of prehospital care
2. Designed to help bridge the gap between:
   a. Access to primary care services
   b. The needs of the community

B. The role of the community paramedic

1. Differs from the traditional role of the paramedic
2. Community paramedic's focus is on working with the patient:
   a. In the home
   b. To prevent conditions from escalating to threats requiring emergency medical care
3. Similarities to paramedic in a traditional role:
   a. The community paramedic is an extension of the physician in the field (BUT he or she is an extension of the primary care physician and not the emergency department physician).
   b. Community paramedics also interact with the local community through public health initiatives such as vaccinations.
   c. Just as the paramedic's standard scope of practice varies from jurisdiction to jurisdiction, the community paramedic's role will vary from location to location.
4. Depending on local protocols and programs, community paramedic home visits may include:
   a. Home safety assessment
   b. Chronic disease monitoring and management
   c. Medication inventory and compliance
   d. Wellness check
5. All community paramedics work under the direction of a medical director of a community paramedicine program, who is a physician.

C. Community paramedicine programs

1. Based on an expanded role for the paramedic
2. Typically rely on the primary foundation and scope of the National Highway Traffic Safety Administration's (NHTSA) National Standard Curricula for paramedics

   a. Community paramedic candidates obtain additional specialized education and clinical experience according to local requirements.
   b. The scope of practice is within the initial scope of practice for a paramedic, but expands the definition to when, where, and how community paramedics deliver their services and apply their expertise.
3. The other key concept: the reliance on the local community needs assessment
   a. Performed by the state's Public Health Department and emergency managers annually
   b. Seeks to identify the health care needs of a community and identify solutions
      i. Example: If a community needs assessment reveals that the local population experiences higher rates of diabetes and emergency department visits, a community paramedicine program can provide home visits to assess a patient's compliance with medications and nutrition plans.

II. History of Community Paramedicine

A. Red River project

1. One of the first pilot projects to use paramedics in an expanded role to meet an identified community need.
2. Project failed due to an influx of new primary care workers changing the needs assessment of the community.
3. Introduced the terms community paramedicine and community paramedic

B. International community paramedicine programs

1. In 2005, the International Roundtable on Community Paramedicine was formed.
   a. Defined community paramedicine as a model of care whereby paramedics apply skills in nontraditional community-based environments (outside of the usual emergency response/transport model)
2. In 2006, the Canadian province of Nova Scotia began its community paramedicine program.
   a. Recognized as one of the leaders of the community paramedicine movement
   b. In their model, community paramedic is incorporated with nurse practitioners to triage, treat, and release patients.
3. Other systems, in places from Europe to Australia, are developing the community paramedicine model as components of their health care systems.

C. US community paramedicine programs

1. In 2015, more than 33 states had some type of community paramedicine or integrated mobile health program.
   a. Mobile integrated health care (MIH): provide services utilizing a wide range of allied health care professionals, including community paramedics.
   b. Minnesota was the first state to establish licensing for community paramedics.

D. Evolution of community paramedicine

1. Community paramedicine is still in its development, implementation, and integration phase.
2. Funding of programs must be established and sustained for community paramedicine to continue to grow and evolve within the current health care system.
    a. Current funding models vary:
        i. Hospital reimbursement for services
        ii. Grants
        iii. Small fees charged to the patient for home visits
        iv. Reimbursement programs when community paramedic is part of a hospital/clinic setting
3. Community paramedics play a critical role within current US health care system.
    a. Fill gaps in delivery of health care services
    b. Meet the needs of each unique community

III. Requirements of the Community Paramedic

A. The term community paramedic means different things in different parts of the globe, depending on the provider's role and background.

1. According to the International Roundtable on Community Paramedicine, community paramedic practices within an:
    a. Expanded scope (ie, applying specialized skills and protocols for which the provider received training in his or her original program or established scope of practice)
    b. Expanded role (ie, working in nontraditional roles using existing skills within defined scope of practice)
2. The most common model in the United States is the expanded role model.
    a. The community paramedic works within the scope of practice established for emergency medical personnel, but with some additional education and competency geared toward community health.

B. Becoming qualified

1. The Community Paramedic Education Curriculum was first developed and trademarked by the North Central EMS Institute.
    a. With input from a cohort of EMS professionals across the country
    b. Initial curriculum will be updated and modified as the field evolves
2. Throughout the United States, training programs for community paramedics based on the North Central EMS Institute's curriculum are being developed.

C. Following medical direction

1. In the United States, community paramedics follow the structure of the scope of practice as defined by the NHTSA's National Standard Curricula for paramedics.
   a. Community paramedics do not practice independently, but work under the medical direction of:
      i. A medical director
      ii. The patient's primary care physician
   b. A key component in many programs is the critical link with the primary care physician.
      i. The primary care physician may act as the program's medical director.
      ii. May refer the patient to the community paramedicine program for health care services
      ii. Writes the patient's plan of care, which directs the community paramedic on how to monitor and manage the patient during home visits

IV. Roles of the Community Paramedic

A. Bringing primary care to the home

1. One key role of the community paramedic is bringing primary care into the patient's home.
   a. Community paramedic reinforces information and instructions from primary care physician
   b. During a home visit, the community paramedic may communicate directly with the medical director and serve as the eyes and ears of the physician.
   c. The community paramedic may serve as a "translator" between the patient and patient's primary care physician.
      i. Example: The patient may read "Reduce cholesterol by 10 points" on the plan but not understand what this means or how to accomplish it. The community paramedic can explain the steps that the plan of care recommends to accomplish the goal.
      ii. The community paramedic can report back to the patient's physician via documentation with additional information about the patient that was revealed during the home visit.

B. Serving as navigator for patients

1. To be effective, the community paramedic must:
   a. Be thoroughly familiar with the outreach services available in the community
   b. Be an advocate for the patient and help connect the patient to services that exist within the community

V. The Health Care Team

A. Community paramedics are new and innovative members of the health care team.

1. As community paramedicine programs evolve, the role of the community paramedic will be integrated and expanded as part of the patient's health care team.
2. Building bridges to span the gaps in patient care requires forming working partnerships within the existing health care structure.

B. Medical director

1. Serves as:
   a. Liaison to the health care organizations requesting a community paramedic
   b. Educator
   c. Supervisor
   d. Resource to the community paramedics in their programs
   e. Evaluator of community paramedicine services
   f. Conduit through which information gathered from home visits is processed and sent to the patient's primary care physician
2. The community paramedic forms a relationship with the medical director first during training. Periodic meetings to review cases, patient plans, and patient outcomes reinforce this bond and help lead to better patient outcomes.

C. Physician

1. The physician plays a vital role in a community paramedicine program.
   a. First and foremost, the physician (whether the medical director or the patient's primary care physician) determines how the community paramedic will monitor and manage the patient in the field.
   b. A primary care physician must have a commitment and belief in the community paramedicine program.
   c. The community paramedic must be effective clinically and also communicate effectively with the primary care physician.

D. EMS system

1. The community paramedicine program must have a link to the existing EMS system.
2. The community paramedic:
   a. Helps maintain continuity of care even if the scene shifts to an emergent one
   b. Can discover an emergent condition, activate EMS, and transport the patient to the appropriate receiving facility
   c. Can provide the full patient history to the staff at the receiving facility, thereby ensuring the best care

E. Nurses

1. Play a critical role in an effective and efficient community paramedicine program in the home and primary care setting
2. To provide a continuum of care, a good community paramedicine program should:
   a. Have good communication and a good working relationship with nurses
   b. Fill the gaps in the community health care system but not encroach on services that are already established and effective
   c. Be able to refer appropriate patients to home health providers and accept referrals

F. Social worker

1. May connect patients to the community paramedicine program and primary care physicians
2. Serves as a member of the patient health care team
   a. Example: A patient with significant behavioral health challenges may have a social worker assigned to help with daily activities.
3. Helps with taking medication inventories and on medication compliance
4. The community paramedic may connect the patient with social services.

G. Case manager

1. As patients require a wider scope of services to maintain their health and in an effort to help contain health care costs, a case manager may be employed to coordinate appropriate care.
2. May refer patients to community paramedicine program
3. May act as a conduit through which information gathered from home visits is sent to primary care physician
4. Connects patients to appropriate services, such as medical specialists or visiting nurses

VI. Building Bridges Across the Gaps

A. Key to an effective community paramedicine program:

1. Establishing effective working relationships with all community stakeholders (eg, hospitals, home health services, primary care providers, and mental health services, etc)
   a. A community paramedicine program must:
      i. Find the gaps in the community
      ii. Foster relationships among the organizations servicing the community
      iii. Develop strategies to meet the identified needs

Post-Lecture

Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (**date to be determined by instructor**).

B. Read Chapter 2, "Personal Safety and Wellness," for the next class session.

Chapter 2
Personal Safety and Wellness

Unit Summary

After students complete this chapter and the related course work, they will be able to list the components that contribute to wellness and their importance in managing stress, identify the physiologic, physical, and psychological responses to stress, describe the warning signs of burnout, describe the standard precautions used to prevent infection when treating patients, describe the steps necessary to determine scene safety and to prevent work-related injuries in a home visit environment, and recognize the possibility of hostile situations and the steps to take to diffuse them.

Objectives

1. List the components that contribute to wellness and their importance in managing stress. (pp 13-16)
2. Identify the physiologic, physical, and psychological responses to stress. (pp 16-19)
3. Discuss reactions to expect from patients and how you can effectively work with patients exhibiting a range of behaviors. (p 19)
4. Identify three stress management techniques. (pp 19-20)
5. Identify the warning signs of burnout from stress. (pp 20-21)
6. Describe posttraumatic stress disorder (PTSD) and steps that can be taken to provide support for people at risk for PTSD. (p 21)
7. List various routes of disease transmission. (pp 21-22)
8. Describe the standard precautions that are used to prevent infection when treating patients. (pp 22-23)
9. Identify the steps to take for personal protection from airborne and bloodborne pathogens. (pp 23-25)
10. Explain postexposure management when exposed to patient blood or body fluids. (p 25)
11. Recognize the possibility of hostile situations due to behavioral emergencies and the steps to take to deal with them. (pp 25-26)
12. Describe how to safely lift and move a patient in the home environment. (p 26)

Readings and Preparation

- Review all instructional materials including ***Community Health Paramedicine***, Chapter 2, and all related presentation support materials.
- Review local protocols relating to reactions from critically ill and injured patients, steps that can be taken to provide support for people at risk for PTSD, standard precautions that are used to prevent infection when treating patients, the various types of personal protective equipment, a community paramedic needs to wear, and hostile situations due to behavioral emergencies.

Support Materials

- Lecture PowerPoint presentation

Enhancements

- Direct students to visit Navigate 2.
- Provide copies of local protocols.

Unit Activities

Writing assignments: Instruct each student to put together a scenario to illustrate the physiologic, physical, and psychological responses to stress and the techniques for working in particularly stressful situations.

Student presentations: Divide students into groups. Instruct each group to act out the techniques for working in particularly stressful situations (developed for the writing assignment) for the rest of the class.

Group activities: Discuss and critique each student presentation as a group. Discuss problems regarding the standard precautions that are used to prevent infection when treating patients, the steps necessary to determine scene safety and to prevent work-related injuries in a home visit environment.

Pre-Lecture

You are the Community Paramedic

"You are the Community Paramedic" is an opening case study that encourages critical thinking skills.

Instructor Directions

1. Direct students to read the "You are the Community Paramedic" scenario found at the beginning of Chapter 2.

2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question.
3. You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. Providing care for patients

1. Some of the most important skills for a member of the health care community are scene safety or safety in general.
2. Equally important are principles of self-care—principles for ensuring your own wellness.
3. If you have not prepared yourself, you may not be able to adequately serve your patients.
4. The goal is to be an example of wellness for your patients.

II. Components of Well-Being

A. Components of wellness

1. Physical
2. Mental
3. Emotional
   a. Some believe that a fourth component, spiritual, is also essential.

B. Physical well-being

1. Muscle strength, flexibility, cardiac endurance, emotional equilibrium, posture, state of hydration, food, and sleep all have an effect on your quality of life.
   a. May directly impact your chances of avoiding injury and your ability to deal with the mental stress associated with work in health care
2. The American Heart Association's Life's Simple 7 includes seven steps that have been found to improve heart health:
   a. Getting active
   b. Controlling cholesterol
   c. Eating better
   d. Managing blood pressure

e. Losing weight
f. Reducing blood sugar
g. Stopping smoking

3. Nutrition
   a. Research has shown consequences of poor nutrition (eg, cardiac illness, type 2 diabetes, obesity, etc.)
   b. Today's education on nutrition suggests eating foods from the four main food groups in prescribed amounts.
   c. Research shows that each person's requirements are different, so nutritional requirements should be designed for individual needs.
      i. Example: Moderately active women 19 to 30 years of age require approximately 2,000 calories per day. The same calorie level is suggested for sedentary men older than 50 years.
   d. The US Department of Agriculture (USDA) 2010 Dietary Guidelines focus on types of foods. The MyPlate icon shows relative portion sizes of the five food groups.
      i. Fruits
      ii. Vegetables
      iii. Grains
      iv. Meat and beans (proteins)
      v. Dairy
   e. Best way to sustain energy on the job
      i. Preplan your meals
      ii. Keep yourself hydrated
      iii. Avoid soft drinks
      iv. Minimize intake of caffeine
      v. Carry numerous small snacks (raisins, nuts, fruits)
4. Weight control
   a. The USDA's 2015–2020 Dietary Guidelines encourage eating a variety of foods that are dense in nutrients in the right amounts for life.
      i. Make healthy food choices every day
      ii. Eat less
      iii. Minimize salt intake
   b. Gradual weight reduction is the key, and this requires you to plan.
5. Exercise
   a. Regular exercise has been shown to improve:
      i. Sleep
      ii. Mental capacity
      iii. Ability to cope with stress
      iv. Overall long-term health

   b. Your exercise program depends on your personal preferences and goals and can be targeted on maintaining or improving:
      i. Your cardiovascular endurance
      ii. Your flexibility
      iii. Your physical strength
   c. Adults should engage in at least 30 minutes of moderate to vigorous physical activity every day to help build optimal cardiovascular endurance.
6. Smoking
   a. If you do not smoke, do not start.
      i. Residue on clothing could cause serious effects on an already sick patient.
      ii. If you are trying to quit, understand that smoking is an addiction and quitting may not be easy.
      iii. Talk to your doctor: there is a variety of programs that help to reduce a smoker's psychological dependency (eg, written and audio instructions, medications, counseling, psychotherapy, hypnotism, and acupuncture).
7. Periodic health risk assessments
   a. In addition to sleep, diet, exercise, hydration, and all the other elements that make up a healthy lifestyle, hereditary factors may have an effect on your overall health.
      i. Consider researching your immediate family's history
      ii. The most common hereditary health risk factors are heart disease and cancer.
      iii. Share this information with your primary care physician.

C. Mental well-being

1. In most cases, candidates for community paramedic programs have years of experience and are exemplary field paramedics.
2. The downsides:
   a. They may bring emotional baggage to the new role.
   b. They may be uncomfortable with a new scope of practice and more individual responsibility.
   c. Community paramedics will form attachments to patients who will die.
   d. They may blame themselves when the patients suffer setbacks.
3. A community paramedic needs to be in control of his or her emotions.
4. A simple thought to remember is that a professional is someone who can remain calm and think clearly when everything else is in disarray.

D. Emotional well-being

1. Professional caregivers have a natural interest in helping people.
2. The key to remaining healthy in a lifelong practice of health care is to make a deliberate effort to create a healthy balance between life at work and life away from work.

   a. It is important to separate yourself from your career from time to time and focus on your personal life and family.
3. Community paramedics need to develop strategies for coping with stress.

E. Spiritual well-being

1. Human spirituality is an unseen dimension of human experience.
   a. Some people address it with formal religion.
2. Your respect for the beliefs of patients or families will help in providing effective patient care.
3. It is also important to respect your own spiritual well-being as a means of reducing:
   a. Stress
   b. Potential burnout

III. Patient Wellness

A. Assessing wellness

1. Community paramedics
   a. Respond
   b. Assess
   c. Treat
   d. Educate
      i. Wellness is an active and ongoing process of lifestyle and personal choices.
      ii. Community paramedics work with patients to help them progress toward optimal wellness.
2. Areas to consider when you are assessing a patient's lifestyle include:
   a. Proper weight control
   b. Good nutrition
   c. Physical activity and exercise
   d. Control of health risks such as:
      i. Use of tobacco, alcohol, and drugs
      ii. Lack of sleep (less than 7 hours per night)
      iii. High levels of chronic stress

IV. Stress

A. What is stress?

1. Any event that causes us to react either physically, emotionally, or mentally is stress.

2. Stress is a reaction of the body to any agent or situation (stressor) that requires the person to adapt.
3. Dr. Hans Selye classified stress into two categories:
   a. Eustress (positive stress; motivates a person to achieve)
   b. Distress (negative stress; the stress that a person finds overwhelming or debilitating)

B. Stress triggers

1. A stress response often begins with events that are perceived as threatening or demanding, but the specific events that trigger the reaction vary enormously from person to person.
2. The following factors trigger stress in most people:
   a. Loss of a loved one (eg, death of a spouse or family member)
   b. Personal injury or illness
   c. Major life event (eg, starting or finishing school, pregnancy, marriage)
   d. Job-related stress (eg, conflicts with others, excessive responsibility, possibility of losing one's job)
3. The Social Readjustment Rating Scale
   a. Examines life-change units (LCUs)
   b. Ranks 43 stress-producing events in a person's life and assigns a weighted score for each event
   c. Authors predicted that an LCU score above 150 could be associated with disease and illness.
4. To deal effectively with stress, each person needs to make a personal appraisal of the stress triggers in his or her life and take action to minimize their effects.

C. The physiology of acute stress

1. One of the fundamental models for stress evolved from studies of how humans respond to threats.
   a. When a person perceives an event as threatening, a standard series of physiologic reactions is triggered.
3. These physiologic reactions prepare us for fight-or-flight response by activating the sympathetic nervous system.
   a. Mobilize the person either to defend (fight) or run away (flight) in the face of danger
   b. Stress may be chronic, placing the body in a continuous, unrelieved state of alert.
4. Reactions to stress can be categorized as:
   a. Acute stress reactions
      i. Occur during a stressful situation
      ii. Physical symptoms can include but are not limited to stomach ache, indigestion, sweating, and heart palpitations.

   b. Delayed stress reactions
      i. Manifest after the stressful event
      ii. A person may want to learn stress management techniques to handle stress effectively when it occurs.
   c. Cumulative stress reactions
      i. Occur when a person is exposed to prolonged or excessive stress
      ii. After the stressful event is over, the person is unable to "shake off" the effects. Physical symptoms can include fatigue, gastrointestinal problems, headaches, and insomnia.
5. Prolonged or excessive stress has been proven to be a strong contributor to:
   a. Increased rates of virus and infection
   b. Heart disease
   c. Hypertension
   d. Cancer
   e. Alcoholism
   f. Depression

D. Reactions to stressful situations

1. Common responses of patients to illness and injury:
   a. Fear
   b. Anxiety
   c. Depression
   d. Anger
   e. Confusion
2. People may also show one or more of the following psychological defense mechanisms:
   a. Denial (ignore or diminish seriousness of the situation)
   b. Regression (return to an earlier age level of behavior or emotional adjustment; children often exhibit this behavior)
   c. Projection (attributing one's own [sometimes unacceptable] feelings, motives, desires, or behavior to others)
   d. Displacement (occurs when someone redirects an emotion from the original cause of the emotion [such as a cardiac condition] to a more immediate substitute [such as a community paramedic]; could be the cause when patients express anger at the community paramedic)
3. Reactions to illness or injury are often rooted in the patient's culture. A community paramedic should learn the cultural differences of the populations he or she serves.
4. Common responses of family and friends to a patient's illness and injury
   a. Anxiety (people experiencing anxiety can recover fully and provide useful assistance if properly directed)

   b. Blind panic (a person's judgment seems to disappear entirely; it may precipitate mass panic among those present)
   c. Depression (people who sit or stand in a numbed, dazed state; these people need to be brought back to reality as soon as possible)
   d. Overreaction (exhibited by people who talk compulsively, joke inappropriately, and become overly active)
   e. Conversion hysteria (person subconsciously converts anxiety into a bodily dysfunction; he or she may be unable to see or hear or may become paralyzed in an extremity)
5. An attitude of calm and confidence on the community paramedic's part will do much to relieve the anxieties of others.

E. Coping with your own stress

1. Early warning signs of your own stress:
   a. Heart palpitations
   b. Rapid breathing
   c. Chest tightness
   d. Sweating
2. Some stress management techniques:
   a. Controlled breathing
   b. Progressive relaxation
   c. Professional assistance
   d. Focusing on the immediate situation while on duty

F. Burnout

1. Burnout needs to be considered at the earliest stage of community paramedic training so that the community paramedic can start developing attitudes and habits to prevent it.
2. Burnout refers to the exhaustion of physical or emotional strength.
   a. May be a consequence of chronic, unrelieved stress
3. Distress is a learned reaction, based on the way a person perceives and interprets the world around him or her.
   a. Nearly always the result of what a person believes
   b. Beliefs common to health care providers:
      i. "I have to be perfect all the time."
      ii. "I am totally responsible for what happens to patients."
      iii. "A good community paramedic never makes mistakes."
4. Burnout is a type of illness that has signs and symptoms (eg, chronic fatigue, irritability, cynical, negative attitudes, and no desire to go to work).
6. Posttraumatic stress disorder
   a. A condition in which the aftereffects of an event cause intense, possibly debilitating, distress in a person

b. Signs of PTSD include:
    i. Trouble getting an incident out of one's thoughts
    ii. Flashbacks
    iii. Nightmares or sleep disturbances
    iv. Change in appetite
    v. Laughing or crying for no reason
    vi. Withdrawing from coworkers, friends, and family members
c. If your patient is exhibiting these signs you should:
    i. Give your patient information on local support groups.
    ii. Give the patient a list of print and online resources on PTSD.
    iii. Provide information on relaxation techniques.
    iv. Encourage your patient to talk to a person he or she trusts and emphasize that your patient can talk to you.
    v. Advise your patient to avoid consuming drugs or alcohol, as doing so may only magnify negative thoughts and feelings.

V. Disease Transmission

A. Infectious and communicable diseases

1. Infectious disease: a medical condition caused by the growth and spread of small, harmful organisms within the body
2. Communicable disease: a disease that can be spread from one person or species to another
3. As a community paramedic, it's important that you understand how to protect yourself against such diseases.
4. Risk of infection can be decreased by:
    a. Immunizations
    b. Protective techniques
    c. Simple handwashing
5. Proper cleaning and disinfecting of equipment will help to prevent transfer of illnesses to other patients.
6. While all infections result from an invasion of body spaces and tissues by germs, the means by which different germs are spread and infiltrate their hosts vary.
    a. These means are known as the mechanisms of transmission.
7. Infectious diseases can be transmitted through:
    a. Contact (movement of an organism from one person to another through physical touch)
        i. Direct contact (an organism is moved from one person to another without any intermediary, eg, bloodborne pathogens)

ii. Indirect contact (an infection is spread from one person to another through an inanimate object, eg, needlesticks)

b. Air (an infectious agent is spread through mechanisms such as droplets or dust)

c. Food (foodborne)

d. Vector (A vector is an organism [eg, insect or parasitic worm] that carries and transmits an infectious agent.)

VI. Protecting Yourself

A. Risks in the home

1. As a community paramedic, you will spend a great amount of time working inside patients' homes.
   a. Be aware of pathogen risks.
   b. Follow department/agency protocol.
   c. Beware of contaminated body fluids and sharps.
2. Center for Disease Control and Prevention (CDC) developed a set of universal precautions for health care workers.
3. Emergency medical services (EMS) systems follow standard precautions.
   a. Standard precautions approach all body fluids as potentially infectious.
   b. Universal precautions assume that only blood and certain body fluids pose a risk for infectious disease.

B. Immunizations

1. Using basic protective measures can minimize the risk of acquiring an infectious or communicable disease.
2. Prevention begins with maintaining your personal health.
   a. Annual health exams
   b. History of childhood infectious diseases should be on file
3. Immunizations should be kept up-to-date and recorded in your file.
4. Recommended immunizations
   a. Tetanus-diphtheria boosters (every 10 years)
   b. Measles, mumps, rubella (MMR)
   c. Influenza (yearly)
   d. Hepatitis B
   e. Varicella (chickenpox)
   f. Skin test for tuberculosis

C. Personal protective equipment and practices

1. At a minimum, community paramedics should be equipped with certain personal protective equipment (PPE):

a. Gloves
b. Facial protection (masks and eyewear)
c. Gowns
d. N95 respirators

2. Infection control practices:
   a. Wear gloves.
   b. Wash your hands.
   c. Use lotion.
   d. Use eye protection.
   e. Consider wearing a mask.
   f. Protect your body.
      i. Use a gown or trash bag.
   g. Use N95 or N100 respirators.
   h. Clean your equipment.
   i. Properly dispose of sharps.

D. Management of an exposure

1. Follow local protocols in the event that you have been exposed to a patient's blood or body fluids.
2. You should know your protocols before you have to act on them.

E. Hostile situations

1. 2003: National Association of EMS Physicians outlined for the first time an official endorsement of the rights to safety for patients and their field caregivers.
2. If the element of hostility is known or can be anticipated in advance, you should never be allowed to arrive on the scene first.
3. Scrutinize all information and keep yourself on "yellow alert" when on duty.
4. Beware of any situation that has the potential for violence (eg, shouting, abusive language, threatening gestures) before, during, and after you provide care.
5. You can ask for law enforcement whenever your intuition suggests the situation could be violent.
6. Once in contact with a hostile patient, concentrate on deescalating the patient's emotions.

VII. Body Mechanics

A. Proper lifting techniques

1. There are a number of habits you can develop to prepare yourself to lift most weight ranges.
   a. Minimize the number of total body lifts you have to perform.
   b. Coordinate every lift prior to performing the lift.

i. Use clear communication.

c. Minimize the total amount of weight you have to lift.

d. Never lift with your back

i. Use proper form when lifting.

e. Ask for help.

Post-Lecture

Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (**date to be determined by instructor**).

B. Read Chapter 3, "Professional Boundaries," for the next class session.

Chapter 3
Professional Boundaries

Unit Summary

After students complete this chapter and the related course work, they will be able to define professional boundaries and limits, describe why professional boundaries are vital to maintain in the patient-provider relationship, describe the barriers that hinder the creation and maintenance of professional boundaries, discuss strategies used to ensure the personal safety of the community paramedic, identify the components of a personal safety plan and how to develop one.

Objectives

1. Define professional boundaries and limits. (pp 30-31)
2. Describe why professional boundaries are vital to maintain in the patient-provider relationship. (pp 30-31)
3. Identify how professional boundaries protect both the patient and the community paramedic. (p 31)
4. Summarize the challenges that may interfere with creating and maintaining professional boundaries. (pp 31-32)
5. Describe the warning signs that a professional boundary has been breached. (p 32)
6. Identify the stages of a home visit. (p 33)
7. Discuss the strategies used to ensure personal safety during each step of the home visit. (pp 33-34)
8. Identify the components of a personal safety plan. (pp 34-35)
9. Describe how to develop a personal safety plan. (p 35)

Readings and Preparation

- Review all instructional materials including ***Community Health Paramedicine***, Chapter 3, and all related presentation support materials.
- Review local protocols relating to defining professional boundaries, the challenges that interfere with creating and maintaining professional boundaries, warning signs that a professional boundary has been breached, the development and implementation of a personal safety plan.

Support Materials

- Lecture PowerPoint presentation

Enhancements

- Direct students to visit Navigate 2.
- Provide copies of local protocols.

Unit Activities

Writing assignments: Instruct each student to put together a scenario to illustrate the professional boundaries of a community paramedic and a patient.

Student presentations: Divide students into groups. Instruct each group to act out the professional boundaries of a community paramedic and a patient for the rest of the class.

Group activities: Discuss and critique each student presentation as a group. Discuss problems regarding professional boundaries and limits, the challenges that interfere with creating and maintaining these boundaries, and strategies to use when communicating with a patient about his or her care.

Pre-Lecture

You are the Community Paramedic

"You are the Community Paramedic" is an opening case study that encourages critical thinking skills.

Instructor Directions

1. Direct students to read the "You are the Community Paramedic" scenario found a the beginning of Chapter 3.
2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question.
3. You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. Community paramedics compared to EMS

1. On average, EMS providers have patient contact or interaction for less than 30 minutes.
2. A typical community paramedic home visit will be up to 60 minutes.
3. Community paramedic will have more exposure to:
   a. The patient
   b. The patient's living environments
   c. Potential hazards posed by the patient and environment
4. The community paramedic establishes a long-term therapeutic relationship over multiple visits.
   a. Typical model:
      i. Community paramedic initially sees patient weekly
      ii. Programs last 4 to 8 weeks
5. This change in how community paramedics interact with patients makes it essential to review:
   a. Professional boundaries
   b. Personal safety
   c. Patient interactions

II. Professional Boundaries

A. Built on the principles of trust, respect, and confidentiality

1. Borders within which the therapeutic relationship between health care provider and patient occurs.
2. Developed by the community paramedic and maintained by community paramedic and patient
3. Critical for the success and safety of both community paramedic and patient
4. Sometimes represent a set of actions performed to ensure the best interests of the patient
   a. Example: Many patient encounters will focus solely on the patient's health issues.
5. Professional boundaries often dictate that the community paramedic not delve into personal aspects of the patient's life.
   a. As trust grows, the community paramedic and patient may mutually agree to adjust these boundaries.

   b. Care must be taken to not move the boundaries beyond what is professionally acceptable.
6. A successful health care provider is able to gain, develop, and maintain a patient's trust.
   a. Trust develops from shared experiences and successful interactions.
   b. Result is greater openness and more effective communication.
      i. Example: Maybe the patient has difficulty staying current with medications because no family members are willing to take him or her to the pharmacy.
   c. A patient's willingness to share details gives the community paramedic greater insight into how to approach patient care holistically.
   d. Patient has greater sense of security.
7. When considering professional boundaries, it can be beneficial to think of the continuum of the therapeutic relationship.
   a. Defined as the interactions between the patient and health care provider
      i. Underinvolvement: patient is not receiving adequate attention from health care provider and patient's health needs are not addressed
      ii. Overinvolvement: health care provider is too involved
8. This balance between maintaining professional boundaries but also building trust and confidence is also faced by physicians.
   a. Strive for compassionate and empathetic care without overinvolvement
   b. Achieve this by maintaining a professional distance and boundaries while providing care
9. Within the boundaries of the patients' homes, community paramedics must:
   a. Establish trust
   b. Keep a professional distance
   c. Maintain open lines of communication

B. Role of the community paramedic in maintaining professional boundaries

1. As the professional, the community paramedic must:
   a. Act in the best interests of the patient
   b. Be responsible for managing any boundary issues
2. Community paramedic must maintain the boundaries because:
   a. Some patients may have challenges with setting boundaries and protecting themselves if boundaries are breached, especially patients with chronic illness or disability.
   b. Some patients may breach a boundary.
3. When both the community paramedic and the patient understand and respect professional boundaries, both are protected physically and mentally.
   a. There are clearly defined limits on:
      i. Physical contact

ii. Emotional attachment
iii. Privacy

4. By maintaining a professional distance or emotional detachment, community paramedics can avoid compassion fatigue or burnout.
5. Compassion fatigue
   a. Occurs when the health care provider becomes overwhelmed by a patient's problems, sadness, or grief.
   b. Signs of compassion fatigue:
      i. A sense of anger or anxiety when the patient's name appears on the list of home visits
      ii. Frustration and a short temper when interacting with the patient during home visits
      iii. A strong desire to avoid any contact with the patient or answer any of the patient's calls

C. Common challenges in maintaining professional boundaries

1. Common areas where setting professional boundaries can be challenging:
   a. Offering an appropriate level of self-disclosure (eg, sharing information that could endanger community paramedic or community paramedic's family)
   b. Visiting patients while off duty
   c. Living in a small community
   d. Giving or receiving significant gifts (eg, a patient could expect favors and special treatment in return for gifts)
   e. Managing dual and overlapping relationships
      i. Becoming friends (eg, patient tries to leverage the previous relationship to influence care; temptation on part of provider to provide above standard of care)
      ii. Maintaining established conventions
      iii. Engaging in physical contact

D. Common dilemmas in maintaining professional boundaries

1. If boundaries are being crossed, ask yourself the following questions:
   a. Is this is my patient's best interest?
   b. Whose needs are being served?
   c. How will this have an impact on the service that I am providing?
   d. Should I make note of my concerns or consult with a colleague or supervisor?
   e. How would this be viewed by the patient's family, significant other, or physician?
   f. How would I feel telling a colleague or the patient's physician about this?
   g. Am I treating this patient differently? (For example, appointment lengths, time of appointments, extent of personal disclosures)
   h. Does the patient mean anything "special" to me?

i. Am I taking advantage of the patient?
j. Does this action benefit me or my agency rather than my patient?
k. Am I comfortable in documenting this decision or behavior in the patient file?

E. Warning signs of professional boundary violations

1. Warning signs that indicate that a professional boundary has been crossed or is about to be crossed include the following:
   a. Frequently thinking of the patient when away from work, including romantic or sexual thoughts
   b. Seeking social contact or spending free time with the patient
   c. Feeling a sense of excitement or longing related to the patient
   d. Sharing personal information or discussing work concerns, including talking about coworkers, with the patient
   e. Feeling so strongly about the patient's goals that you disregard colleagues' comments or the wishes of the patient or his or her family, or believing you are the only one who can understand or help achieve the patient's goals
   f. Feeling responsible for the patient's limited progress
   g. Noticing more physical touching than is appropriate or required for the situation
   h. Mentioning sexual content in conversations with the patient
   i. Making special exceptions for your patient because the patient is appealing, impressive, or well connected
   j. Receiving feedback from others that your behavior with the patient is overly familiar or intrusive
   k. Keeping secrets with or for a patient
   l. Showing favoritism
   m. Meeting a patient in a setting that is not conducive to providing patient care

F. Potential consequences of blurry boundaries

1. At the very least, blurred boundaries can create uncomfortable situations for the patient or the community paramedic.
2. The most severe consequences can include:
   a. Claims of harassment with litigation pursuant to those claims
   b. Situations in which the community paramedic's safety is in jeopardy
      i. Example: A community paramedic using the terms "babe" or "honey" may lead the patient to believe that initiating physical contact is okay.

III. Personal Safety

A. Stages of a home visit

1. The community paramedic must prepare for a home visit by anticipating all the stages of the home visit:

a. Before
b. During
c. After

B. Before the home visit

1. Let your supervisor and colleagues know your schedule.
2. Use dispatch to track your location (ie, radio or call in).
   a. Arrival on scene
   b. Departure from scene
3. Keep information about the patient up-to-date.
4. If unfamiliar with the patient or the location of the patient's home, ask another staff member.
5. Know where you are going before you get into your vehicle.
6. Contact your patient before your visit so the patient is prepared for your arrival.
7. In the vehicle
   a. Ensure your vehicle is in good working order.
   b. Before entering the vehicle, check the backseat and scan beneath the vehicle.
   c. Keep your doors locked at all times and the windows up.
   d. Keep all valuables (eg, smartphones, laptops, and purses) out of sight. These items should be locked in the trunk before you leave the agency.
   e. To protect your tires and vehicle, avoid driving over garbage, potholes, and broken glass. Slow down when approaching speed bumps.
   f. Park your vehicle where you can see it. Choose a parking space that is well lit or that offers the safest walking route.
   g. Do not park in the patient's driveway or on a dead-end street. Park in the direction that you will want to go when leaving the home.
8. In the community
   a. When you are traveling to your appointment, be alert and observant. Be aware of your surroundings (ie, do not wear headphones, text, and make phone calls).
   b. Carry a cell phone, smartphone, or portable radio, if available.
   c. When making initial visits to unfamiliar locations, arrange your schedule so that you can make these visits early in the day.
   d. Introduce yourself to local businesses and institutions.
   e. Call the office at scheduled check-in times.
9. Approaching the home
   a. When approaching the home, trust your instincts.
   b. If you feel uncomfortable, leave immediately.
   c. Before parking your vehicle, drive around the area and look for potential hazards (eg, poor lighting, limited visibility, unsecured animals, people yelling, fighting, drinking, or loitering).

d. If the address you have is incorrect, call dispatch or your agency.
e. If you suspect that you are being followed on foot, enter the closest public building and call for help.
f. If a car is following you while you are on foot, turn around and walk in the opposite direction past the car.
g. If people are loitering on the street or sidewalk, give yourself as much room as possible and walk around them or cross the street. Walk with confidence and purpose.
h. If you are confronted verbally, maintain a professional demeanor. Do not attempt to answer verbal challenges.
i. Wear shoes and clothing that are easy to move and run in, should you need to escape a situation.
j. Valuables such as a purse should not be carried in the field; they should be locked in the trunk of the vehicle.
k. Keep your keys securely on you.
l. If you must use an elevator, use an empty one if possible. Press any necessary buttons yourself.

C. During the home visit

1. At the home, take note of signs such as "No trespassing" or "Beware of dog." Such signs may be indicators of the homeowners' attitude toward strangers.
2. Before knocking on the door, pause and listen. If you hear unsafe activity such as yelling, leave immediately.
3. If you are unfamiliar with the person who answers the door, before entering the home, find out who the person is and why he or she is at the home during your visit.
4. As you approach the patient, note your entry and exit points and make sure you have a clear path of escape.
5. Maintain situational awareness as you work with the patient. This can be achieved by noting any changes in body language that may indicate a change in the patient's mood.
6. You will need to practice universal precautions. Utilize sharps techniques and aseptic practices. Always wear appropriate personal protective equipment.

D. After the home visit

1. After the home visit is completed, there are additional steps you can take to maintain your personal safety.
   a. Wash your hands.
   b. Disinfect your equipment to ensure that you do not contaminate yourself or your next patient.
   c. Document the patient encounter. This protects you legally. Document any uncomfortable or unsafe situations and report such incidents to your supervisor.

IV. Personal Safety Plan

A. Components of a personal safety plan

1. A personal safety plan is a tool that allows the community paramedic to:
   a. Assess the situation
   b. Preplan ways to ensure personal safety during patient encounters
2. Common components of a personal safety plan may include (but are not limited to):
   a. Previsit procedures
      i. This section outlines the steps you will take before entering the patient's home to ensure your safety (eg, familiarizing yourself with the neighborhood; identifying, from your view of the home's exterior, entry and exit points; reviewing the patient's demographic information).
   b. During the visit procedures
      i. This section outlines what you will be doing during the home visit (eg, not allowing the patient or a family member to position themselves behind you, keeping your back to the wall to ensure no one is able to approach you from behind, and wearing appropriate personal protective equipment).
   c. Postvisit procedures
      i. This section outlines what you will be doing after the visit. It can include your decontamination procedures, documentation procedures, and scheduling of further appointments.
   d. Communication procedures
      i. This section includes the procedures you will follow to communicate with your patient and with your agency.
      ii. How will you ensure that dispatch knows your location at all times?
      iii. Will you radio in or will you have access to a cell phone?
      iv. How and when will you contact dispatch?
      v. How and when will you contact law enforcement or backup if you need it?
   e. Personal disclosure procedures
      i. Before the home visit, determine how much personal information you will disclose to your patients.
      ii. If you have already determined that you will not share certain information, such as details about your family, it is easier to stick to that plan when the situation arises than to decide in the moment whether you should share that information when the patient asks about you.

B. Developing the personal safety plan

1. Developing a personal safety plan can be as simple as creating a document or table on your computer and outlining each component and how you will address it.
   a. Your personal safety plan should be comprehensive but simple.

b. Meet with your supervisor about developing the personal safety plan. He or she can help you think through appropriate actions that will protect you while following agency protocols and procedures.
c. You may have to adjust your personal safety plan based on specific patient situations (eg, one patient may live on a dead-end road; another may live several floors up in a high-rise apartment building).
d. You will need to be flexible with your personal safety plan.

Post-Lecture

Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (**date to be determined by instructor**).

B. Read Chapter 4, “Interactions,” for the next class session.

Chapter 4
Interactions

Unit Summary

After students complete this chapter and the related course work, they will be able to describe the enrollment visit, intake visit, follow-up home visit, and end-of-care visit, including the tasks performed by the community paramedic, describe the qualifications for a disenrollment visit, and explain the factors that influence the education of patients, including health literacy concerns and patients with chronic conditions. The students will also be able to describe the role of payers in reimbursement for services and how to effectively communicate with payers.

Objectives

1. Describe the enrollment visit, intake visit, follow-up home visit, and end-of-care visit, including the tasks performed by the community paramedic. (pp 39-42)
2. Describe the qualifications for a disenrollment visit. (p 42)
3. Explain the factors that influence education of patients, including health literacy concerns. (pp 42-43)
4. Describe the various approaches to educating patients with chronic conditions. (pp 43-44)
5. Describe the role of payers in reimbursement for services. (pp 44-46)
6. Describe how to effectively communicate with payers, including their documentation requirements. (pp 46-47)

Readings and Preparation

- Review all instructional materials including ***Community Health Paramedicine***, Chapter 4, and all related presentation support materials.
- Review local protocols relating to the different types of visits that a community paramedic makes, the education of patients, especially patients with chronic conditions, and how to communicate with payers and meet their documentation requirements.

Support Materials

- Lecture PowerPoint presentation

Enhancements

- Direct students to visit Navigate 2.
- Provide copies of local protocols.

Unit Activities

Writing assignments: Instruct each student to put together a scenario for interactions.

Student presentations: Divide students into groups. Instruct each group to act out the interactions scenario (developed for the writing assignment) for the rest of the class.

Group activities: Discuss and critique each student presentation as a group. Discuss problems regarding the different types of visits that a community paramedic makes, the qualifications for a disenrollment visit, the various approaches to educating patients with chronic conditions, and how to effectively communicate with payers.

Pre-Lecture

You are the Community Paramedic

"You are the Community Paramedic" is an opening case study that encourages critical thinking skills.

Instructor Directions

1. Direct students to read the "You are the Community Paramedic" scenario found a the beginning of Chapter 4.
2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question.
3. You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. Interactions

1. At the heart of patient-centered care are interactions—the exchanges that occur between the community paramedic and:
   a. The patient
   b. The patient's family and caregivers
   c. Other providers and organizations delivering health care services
   d. Resources available in the local community
   e. Insurers of all types

II. Patient Encounters

A. Preparing for the first patient encounter

1. Before your first patient encounter, communication with other health care providers is essential, whether directly or via the patient's medical records, especially with:
   a. The referring hospital
   b. The medical director
   c. Primary care physician
   d. Specialists involved in the patient's care
2. Obtain an electrocardiogram, point-of-care lab tests (per local protocols), and baseline vital signs including the patient's:
   a. Blood pressure
   b. Heart rate
   c. Respiratory rate
   d. Oxygen saturation (on and off supplemental oxygen, if used)
   e. End-tidal carbon dioxide
   f. Weight
   g. Temperature
3. After collecting these data, consult with the medical director to ensure that these baseline measurements do not signal the presence of an acute issue.

B. Enrollment visit

1. Generally the first or second encounter the community paramedic will have with a patient
2. During the visit, the community paramedic discusses:

   a. Aspects of the local community paramedicine program
   b. The initial patient goals per the plan of care
   c. The patient's overall understanding of the roles and responsibilities inherent in program participation
3. This visit is the community paramedic's chance to make a good first impression.
4. Introductions and explanations
   a. During the enrollment visit, the community paramedic and the patient should also discuss:
      i. A visit schedule
      ii. A projected end date for achieving goals
   b. An endpoint may help to motivate both the patient and the community paramedic to reach the goals of the plan of care within a certain time frame.
   c. The patient may receive a short card or pamphlet that:
      i. Describes the goals of the community paramedicine program
      ii. Defines the visit schedule
      iii. Provides contact information and ways to research the community paramedicine program (eg, a website)
      iv. A nonemergency telephone number
5. Patient assessment
   a. A complete patient assessment, including a physical examination, is performed during the enrollment visit.
      i. If the visit takes place at the patient's home, a complete physical examination is conducted.
      ii. If the patient is in the hospital, the physical examination may be delayed until the intake visit.
6. Medication inventory
   a. A medication inventory should be obtained during the enrollment visit.
   b. When setting up the appointment for the enrollment visit, ask the patient to have all medications available, including:
      i. Prescribed medications
      ii. Over-the-counter medications
      iii. Herbal supplements
   c. The community paramedic should also access the patient's medical records to obtain an accurate and up-to-date medication list.
   d. If the enrollment visit is in a patient's hospital room, verify the medication inventory during the first home visit.
   e. Ideally, the medication inventory would be recorded electronically.
7. Ending the visit
   a. At the end of the visit, ensure that the documentation of the visit is complete and thorough.

b. Follow local protocols in submitting documentation for review.

C. Intake visit

1. Generally the second visit made by the community paramedic
2. It focuses on identifying:
   a. All social and medical aspects relating to the patient
   b. The barriers to good health or care
3. This visit also includes a full patient assessment, including a physical examination if one could not be performed during the initial enrollment visit.
4. Some community paramedicine programs combine the enrollment visit and the intake visit into one visit.
5. The intake process includes all aspects of the patient's livelihood and assesses how well he or she is able to perform the activities of daily living.
6. A standard checklist developed by the community paramedicine program is recommended.
7. Patient assessment
   a. A complete patient assessment, including a full physical examination, should be performed during each visit.
   b. This assessment will include:
      i. Weight measurements
      ii. Point-of-care lab tests for specific conditions (if local protocols permit)
8. Patient needs assessment
   a. The patient's social needs may be evaluated through a patient needs assessment.
   b. This is a tool that takes into consideration factors such as the patient's:
      i. Health history
      ii. Living environment
      iii. Social network
   c. A thorough patient needs assessment provides the patient information that the community paramedic requires to help determine all of the patient's needs.

D. Follow-up or scheduled home visit

1. Follow-up visits are scheduled nonemergency visits that follow the enrollment and intake visits and focus on the monitoring and management of the patient.
2. Each follow-up visit should include the following:
   a. Full patient assessment
   b. Goal and plan of care review and management
   c. Disease-specific education and ensuring understanding and compliance with the plan of care
   d. Review of the visit and confirmation of the next visit's scheduled date

e. Full detailed documentation, which is supplied to the medical director and members of the health care team per local protocols

3. During follow-up visits, it is important to help patients understand and develop a communication process with their long-term providers such as:
   a. Primary care physicians
   b. Specialists
   c. Case managers
4. One way to facilitate patient communication with his or her providers is to provide a patient binder and/or educational materials
5. Providing a patient binder can ensure continuity of care and avoid duplicated or conflicting treatments.
6. Binders may contain:
   a. Face sheet
   b. Health monitoring calendar
   c. Medications list
   d. Medical history list
   e. Educational materials
   f. Lab test results
   g. Appointments
   h. Physician contact information
   i. Questions sections
7. Binders can also take an electronic form.
8. If the follow-up is a telephone visit only, it is important to document this encounter and to ensure that the patient is meeting his or her goals.
   a. Medical director needs to establish parameters or guidelines of phone visits.

E. Unscheduled home visit

1. Unscheduled home visits occur when a patient has called 9-1-1 or the agency's nonemergency line requesting assistance or help.
2. It is important to understand the local ordinances or state laws regarding a patient calling 9-1-1.
3. The medical director must establish a response protocol to ensure no laws or statutes are being violated if a community paramedic responds in lieu of an emergency medical services (EMS) response unit.

F. End-of-care visit

1. The final visits that community paramedics will have with their patients
   a. Dependent on the patient meeting the goals of the plan of care
   b. Ensure that the patient understands how future communication should occur
2. During the end-of-care visit, the community paramedic may cover the following bases per local protocols:

a. Repeat or evaluate the patient needs assessment and medication inventory.
b. Evaluate the patient's understanding of his or her medical condition(s).
c. Ensure that an ongoing communication process has been established between the patient and his or her provider(s).
d. Identify any remaining barriers to success that this patient may have, and ensure an appropriate transfer of care to the necessary entity.
e. Congratulate your patient on his or her success!

G. Disenrollment visit

1. Visits in which community paramedics must end the program due to patients' continued refusal to follow the plan of care
2. It is important to develop a generalized guideline for the community paramedicine program to follow when nonadherence is a problem.
3. During the disenrollment visit, a full patient assessment may be performed, including:
   a. Identifying and documenting which specific guidelines, policies, or medical advice the patient is not adhering to
   b. How long this behavior has occurred
   c. Patient's barriers to success, which might include the patient's own perception
   d. Patient's psychological condition
4. Ensure that the patient or another competent adult or medical direction fully understands the implications of the nonadherence and disenrollment from program.
5. Depending on the community paramedicine program, the patient may sign a refusal or declination of care form if possible.
   a. This form may contain warnings such as a formal "Against Medical Advice" acknowledgement, much like those found on EMS refusal-of-care forms.
   b. Precise format will differ for each program and will depend on local, regional, or state protocols and laws.

III. Education

A. Patient education

1. Community paramedics are well positioned to deliver customized education, as part of their focus on truly patient-centered outcomes.
2. Because community paramedics can take time to listen to their patients, they also have a unique opportunity to identify barriers or gaps in knowledge for each patient.
3. It is important for the community paramedic to:
   a. Understand how adult learning takes place
   b. Determine the patient's educational level

c. Determine how to communicate effectively with each patient based on his or her individual needs.
    i. Example: Patients with congestive heart failure often say that they do not add salt to their meals because of the sodium restrictions they have.
    ii. Community paramedics have the luxury of spending more time with patients, so they can review the actual sodium content in various types of foods that patients eat daily.

B. Learning styles

1. There are three types of learning styles:
    a. Visual
        i. Visual learners must be able to see what is being presented and retain written information well.
    b. Auditory
        i. Auditory learners prefer to hear information and are better able to retain information when it is presented this way.
    c. Kinesthetic
        i. Kinesthetic learners must be able to take the information and physically apply it to retain the information, such as by demonstrating a skill.
2. When educating a patient, it is critical to discuss, write, and help patients apply the knowledge they are being given—whatever works best for the patient.
    a. Some patients may have had to learn new styles, such as a visual learner who has lost his or her eyesight.
3. During the intake visit, ask patients how they prefer to learn.
    a. You should then tailor the education to the patient's preferred learning style.
        i. Example: After demonstrating how to use a glucometer, ask the patient to practice measuring his or her blood glucose level while you observe.

C. Health literacy

1. Health literacy is:
    a. The ability to gather or otherwise obtain basic health information
    b. Comprehend the information
    c. Make appropriate health decisions based on that information
2. Low health literacy is known to produce poor outcomes in health care.
3. Patients must be able to comprehend the health-related information provided to them if they are to accomplish:
    a. Self-efficacy
    b. Self-regulation
4. The community paramedic will need to understand each patient's health literacy level and customize the education provided to that person's needs.
    a. Start at a third-grade level and add complexity.
    b. Keep in mind the mantra "Keep it simple."

5. If your patient has a very specific and limited abilities to learn, you will need to:
    a. Ask patients what level of education they have achieved (eg, high school, college)
    b. Ask whether they have any specialized learning conditions (eg, dyslexia, intellectual disabilities)
    c. Alternatively, ask patients if they understand or can read back some of the instructions.
    d. Establishing a good rapport is key to encouraging open discussion of these issues.

D. Educating patients with chronic conditions

1. All education for patients with chronic conditions should emphasize six key steps to management:
    a. Go to your doctor.
    b. Take medications as prescribed.
    c. Monitor your symptoms daily.
    d. Maintain a balanced diet for your conditions.
    e. Stay active and exercise as directed.
    f. Limit or avoid use of harmful known substances such as drugs, nicotine, and caffeine.
2. Help patients with chronic disease understand that medicine does not "fix" the medical condition, but help them manage the condition.
3. Confirm the patient's understanding before ending the educational component:
    a Have the patient teach the information back to you.
    b. Ask the patient what he or she understands about the disease.
    c. Ask the patient how this changes his or her daily routine.
    d. Revisit questions to assess patient's progress.
4. Encourage patients to write down questions to ask their providers during future visits.
    a. Patients should write down the provider's answers, and the community paramedic can subsequently assess their understanding of those responses.

E. Selection of educational tools

1. Educational materials will be needed for each of the specific diseases that the community paramedic will be monitoring and managing in each patient.
2. If there is an educational program that you would like to present, you will need to:
    a. Get the appropriate approval to reprint the material
    b. Ensure that the medical director approves of the educational materials
3. Some hospitals may create their own educational pieces and classes, which may be reviewed and approved by the medical director.
    a. If the community paramedic attends these classes, he or she should be prepared to customize the education to each patient's needs.

IV. Interacting With Payers

A. What are payers?

1. A payer is a source of reimbursement funding for services provided to a patient by a health care provider.
2. Payers can be divided into two groups:
   a. Government payers
      i. Examples: Medicare and Medicaid
   b. Private payers
3. Medicare is a federal program that provides health care insurance for:
   a. Adults older than 65 years
   b. Adults and children with disabilities no matter what their income
4. Medicaid is a joint state and federal program that provides health care insurance to adults and families with low incomes.
5. Within Medicare and Medicaid, there are two types of patients:
   a. Fee-for-service patients
      i. Patients who find a provider willing to accept Medicare- or Medicaid-covered patients and whose services are billed directly to Medicare and Medicaid.
   b. Managed care patients
      i. Patients whose care is paid for through a capitated plan and managed by private health management organizations (HMOs) for Medicaid and Medicare.
6. Private insurance companies can be organized into a variety of ways to provide health insurance for patients:
   a. Exclusive provider organization (EPO): A managed care plan where services are covered only when they are delivered by the plan's physicians, specialists, or hospitals; an exception is made in emergencies.
   b. Health maintenance organization (HMO): A health insurance plan that may require patients to live or work in its service area. The plan usually limits coverage to care from physicians who work or contract with the HMO.
   c. Point-of-service (POS) plan: A health plan in which patients pay less if they use providers in the plan's network. Patients can access providers and hospitals outside this network, but at an additional cost.
   d. Preferred provider organization (PPO): A plan that allows patients to access providers and hospitals outside of its network without a referral, but at an additional cost.
7. The Patient Protection and Affordable Care Act (PPACA) requires that people in the United States be covered by a policy that complies with the regulations set forth in this act.

B. Sustainable funding

1. For community paramedicine programs to survive, each program must have some form of sustainable funding.
   a. Initial funding: community, state, or federal grants
   b. More sustainable funding: hospitals, health care organizations, individual EMS agencies
2. Medicare and Medicaid HMOs, along with private insurance companies, are beginning to reach out to EMS agencies to develop community paramedicine programs.
3. Community paramedics can help reduce emergency department visits and improve payers' bottom lines through monitoring, managing, and educating patients with chronic diseases.
4. In recent years, health care in the United States has begun moving toward a patient-centered health care model, which involves patients and their families in:
   a. The design of new care models
   b. The decision making about individual options for treatment
5. As community paramedicine programs search for sources of sustainable funding, they will need to meet the goals of the Institute for Healthcare Improvement's Triple Aim to qualify for such funding.
   a. The Triple Aim is a threefold approach designed to help optimize health care delivery by:
      i. Reducing health care costs
      ii. Improving the health of the public
      iii. Optimizing the patient's health care experience
6. Some of the changes to the payer system include creating organizations that better match the Centers for Medicare & Medicaid Services' transition from fee-for-service to other forms of payment such as:
   a. Value-based payments (VBPs)
      i. Reimbursement strategy used by payers to promote the quality and value of health care services—for example, through pay-for-performance programs that reward improvements in quality metrics
   b. Bundled payments
      i. Reimbursement strategy in which payers provide a single payment for all services delivered
   c. Shared-risk payments
      i. A total cost of care payment model aimed at reducing overall expenditures for an episode of care
7. Accountable care organizations (ACOs) are being formed to ensure that providers are meeting the goals of the Triple Aim by controlling payments.
   a. ACOs are groups of physicians, hospitals, and other health care providers who provide coordinated health care to Medicare-covered patients.

b. The goals of coordinated care is to:
   i. Avoid duplication of care
   ii. Reduce the potential for medical errors
   iii. Help patients receive the correct level of care at the correct time

C. Payer communication

1. With the implementation of the Triple Aim, community paramedicine programs will need to demonstrate that they are meeting the goals of the Triple Aim to receive payment.
   a. Each payer will require specific information, and data collection will be mandatory.
2. In 1994, the National EMS Information System (NEMSIS) was created to link EMS databases across the United States so that information can be shared.
   a. The most recent version of this data set is composed of three separate components:
      i. A demographic data set
      ii. An EMS data set
      iii. A format and definition created to promote sharing of data elements between data systems
3. The sharing of NEMSIS data has the following benefits:
   a. Improved analysis of EMS procedures and patient care
   b. Comparison of data across jurisdictional and state boundaries
   c. Better evaluation of the EMS role in health care
4. In 2017, the standard collection of patient data from EMS systems will change, as a transition is made from NEMSIS 2 to NEMSIS 3.
5. NEMSIS 3 is designed to:
   a. Quickly monitor health issues that arise in specific local areas
   b. Monitor the EMS health care providers, including community paramedicine programs
6. Each community paramedicine program will also need to demonstrate the level of performance of its community paramedics through a set of key performance measures (KPMs).
   a. The EMS Compass project is currently developing these measures to help EMS systems improve the quality of care they deliver.
   b. Paperwork will be mandatory for any health care provider who wants to be reimbursed for services.

D. Documenting patient information for a payer

1. Documenting and collecting data differ for the paramedic versus the community paramedic.

2. To document a nonemergency visit, the community paramedic will use a form created by the department or by one of the electronic patient care record (ePCR) vendors.
    a. This form will capture the specifics of the visit, including a prescription inventory or taking of vital signs, among other requirements.
3. By sharing this kind of data with the hospital and the payer, the community paramedicine program can ensure that they understand that the care provided by the community paramedic is:
    a. Saving the payer money
    b. Keeping the patient out of the hospital
4. Currently, there are no standard billing forms that each payer uses across the United States.
    a. Although each payer may require a different type of form to be completed, in most cases the information is the same.
    b. Each community paramedicine program will have protocols and procedures on how patient information is to be collected and documented for both payers and health care providers.
    c. The medical director will determine how patient information is collected and documented for each community paramedicine program.
5. Full documentation of each encounter is vital to:
    a. Ensure continuity of patient care
    b. Demonstrate to the payers that the community paramedic is meeting the requirements of the Triple Aim

E. Documenting the patient visit

1. The community paramedic faces challenges beyond caring for the patient's specific medical condition, such as meeting the goals of the Triple Aim.
    a. This could mean meeting health care needs that are more social in nature than medical.
2. Sharing patient information outside of the health care system can prove challenging for community paramedicine programs owing to the Health Insurance Portability and Accountability Act (HIPAA).
    a. Community paramedics must understand HIPAA and conform to its rules
        i. What is said to neighbors
        ii. Which resources are consulted to solicit social aid (churches or senior organizations)
        iii. Which resources are accessed to meet basic needs, such as food banks or Meals on Wheels
    b. HIPAA allows the exchange of some data with parties outside of traditional health care organizations in an effort to meet the explicit health care needs of the patient.

   c. The allowable data that can be exchanged must be approved by the organization's HIPAA compliance officer.
3. Each community paramedicine program will determine the types of checklists and forms that the community paramedic will use to document the patient visit.
   a. Special requirements for data collection may be established for community paramedics by their program's medical director.
   b. The community paramedic must document all of the care provided for the patient's medical and social needs.
      i. Examples: Finding ways for the patient to get to the primary care physician
4. The same level of documentation that is required in the hospital or physician's office will be required of community paramedics working in the field.
   a. Community paramedics will meet the highest performance standards and provide cost-effective care.

Post-Lecture

Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (**date to be determined by instructor**).

B. Read Chapter 5, "Ethics," for the next class session.

Chapter 5
Ethics

Unit Summary

After students complete this chapter and the related course work, they will be able to define ethics and describe why the study of ethics is vital to community paramedics, explain the importance of understanding different worldviews, explain traditional ethics theories, describe how ethics can be applied by community paramedics, and identify the steps for evaluating an ethical dilemma.

Objectives

1. Define ethics, and describe why the study of ethics is vital to community paramedics. (p 51)
2. Describe the importance of understanding different worldviews, including naturalism, ethical theism, and postmodernism. (pp 51-53)
3. Explain traditional ethics theories: utilitarianism, consequentialism, deontology, relativism, and ethical reasoning. (pp 53-57)
4. Describe how ethical theories can be applied by community paramedics. (p 57)
5. Identify the steps for evaluating an ethical dilemma. (pp 57-58)

Readings and Preparation

- Review all instructional materials including ***Community Health Paramedicine***, Chapter 5, and all related presentation support materials.
- Review local protocols relating to ethics, different worldviews, and how ethical theories can be applied to community paramedics.

Support Materials

- Lecture PowerPoint presentation

Enhancements

- Direct students to visit Navigate 2.
- Provide copies of local protocols.

Unit Activities

Writing assignments: Instruct each student to put together a scenario to illustrate an ethical dilemma faced by a community paramedic.

Student presentations: Divide students into groups. Instruct each group to act out an ethical dilemma faced by a community paramedic (developed for the writing assignment) for the rest of the class.

Group activities: Discuss and critique each student presentation as a group. Discuss problems regarding the application of ethics to community paramedicine, understanding different worldviews, and how traditional ethics theories can be applied by community paramedics.

Pre-Lecture

You are the Community Paramedic

"You are the Community Paramedic" is an opening case study that encourages critical thinking skills.

Instructor Directions

1. Direct students to read the "You are the Community Paramedic" scenario found a the beginning of Chapter 5.
2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question.
3. You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. Ethics in health care

1. Ethics: the difference between right and wrong
2. The study of ethics is critical to health care providers due to complex issues that occur while providing patient care.
   a. Issues range from professional boundaries to end-of-life issues
3. Community paramedics
   a. Work in an ever-evolving field with new responsibilities and levels of autonomy
   b. Face new ethical dilemmas as they work one-on-one with patients over a longer period of time
4. The purpose of ethics education is to:
   a. Build moral character both in the field and in all aspects of life
   b. Make judgments and decisions in a way so ethically right decisions become habitual
   c. If something is habitual, done naturally, without thinking, it is easier to do.
      i. Example: the likelihood of using profanity increases in an emotionally charged situation for someone who uses such language habitually.
6. The most prominent declarations of ethics in the field of emergency medical services (EMS) are the:
   a. Code of Ethics
   b. EMT Oath
7. These vows were adopted by the National Association of Emergency Medical Technicians in 1978, and they remain in effect today.
8. Despite the importance of taking an oath to do good, these declarations fail to provide understanding, tools, or skills to ensure that the person who takes the vow will uphold the oath.

II. Foundations for Ethics

A. The right decision

1. The roots of philosophy lie in the search for understanding why certain behaviors may be deemed right or wrong.
2. Today, when engaging in decision making, many people rely on:
   a. Principles
   b. Rules

   c. Actions
   d. Consequences
3. Many of these obligations are actually social constructs imposed by authoritative entities such as:
   a. Professional bodies
   b. Organizations
   c. The law
4. The American philosopher Maxine Greene (1917–2014) insisted that each person needs to think critically before choosing a course of action.
5. It is critical to understanding ethics that we learn a basic vocabulary and knowledge of traditional theories.

B. Worldviews

1. Each person's worldview is central to interpreting and making sense of almost everything that is observed or experienced; a person's worldview is his or her personal theory of everything.
2. Ontology describes or defines what is "really real" to that person.
   a. Example: Is it raining outside or not?
3. French philosopher René Descartes: "I think, therefore I am." In other words, a person's thoughts validate that person's existence.
4. Naturalism and ethical theism
   a. Basis: the question of the existence of God, a higher power, or the supernatural
   b. Both views require an element of faith.
   c. Neither view can be empirically proven.
5. Naturalism
   a. Rejects the idea of supernatural or spiritual influences, taking the position that reality is based solely on the tangible world around us
   b. Epistemology (acceptable evidence supporting this perspective on what is real) is limited to those things that are measurable via accepted scientific means.
   c. In regard to things that cannot be explained, advocates of naturalism believe that science has yet to develop the means by which to measure them and/or provide a logical explanation for them.
6. Ethical theism
   a. Based on a belief in, or acceptance of, the supernatural
   b. Goes by many different titles specific to a religion
   c. The epistemology for ethical theism includes science but views the tangible world as evidence of the supernatural being that created it.
   d. People who adhere to this worldview accept religious texts or scriptures as further evidence of the supernatural.

7. Postmodernism
    a. Commonly described as a broadscale skepticism of the logic and values that became commonplace during the Enlightenment period
    b. Modernism was a perspective developed in Europe during the mid-16th and early 17th centuries, a period known as the Enlightenment.
        i. Science and literacy advanced rapidly during this time.
        ii. Result was an ever-increasing number of people who became skeptical of traditionally authoritative institutions telling them what to think.
        iii. Capabilities of scientists were increasing, which contributed to a gradual decrease in reliance on religion (most notably the Roman Catholic Church) to explain complex or mysterious aspects of the physical world.
        iv. Modernists embraced the idea of human autonomy, whereby ethical conduct and absolute truth could be realized independent of faith in or obedience to the supernatural.
    c. Postmodernism evolved as a reaction to modernism in the late 19th and early 20th centuries.
    d. Takes the position that reality exists independent of humanity and challenges the idea that objective methods can fully or accurately describe the whole of reality.
    e. Postmodernists contend that reality is a human construct influenced by:
        i. Culture
        ii. Language
        iii. Experiences
    f. Postmodernism is grounded in subjectivism and relativism.
        i. All truths and realities are relative concepts; everyone must define reality for himself or herself.
        ii. No one can know another's reality because no two people experience life the same way.
        iii. Subjective reasoning: There are no universal, absolute truths, meaning each person decides for himself or herself what is right or wrong.
    g. Issue with postmodernism: crime
        i. If there are no absolutes, no universal truth, there is no absolute right and wrong.

C. Ethics theories

1. Theory: a descriptive statement or an explanation of what will happen when two or more variables are brought together under a certain set of conditions (positive theory).
2. A unique and important aspect of ethics theories is that they are *prescriptive* rather than *descriptive.*
    a. Ethics theories prescribe what *ought* to happen rather than describe what *has* happened or what *will* happen.

3. Utilitarianism
    a. The ethics theory most commonly used in health care
    b. Original formulation by Jeremy Bentham (1747–1832), later refined by the English philosopher John Stuart Mill (1806–1873)
    c. Often referred to as "doing the greatest good for the greatest number"
    d. Falls within the larger category of ethics theories known as consequentialism
        i. Focuses on the consequences of one's actions; often expressed as "the ends justify the means"
    d. The premise of utilitarianism is particularly valuable in health care when the demand for resources outstrips their availability.
        i. Examples: mass-casualty incidents and pandemic or epidemic illnesses
    e. A commonly used scenario illuminates the errant logic of utilitarianism.
        i. Four scientific geniuses in a terrible motor vehicle crash and all four require organ transplantation. Surgeons would be justified in removing the needed organs from a healthy person so that they could save the lives of the four scientists. The happiness of four outweighs the unhappiness of one.
4. Deontology
    a. Described as rules-based ethics, or a duty to act
    b. This theory measures ethical action against adherence to a rule or set of rules.
    c. If following a rule produces more harm than good, it is still considered to be the right or moral action because the applicable rule was followed.
    d. The German philosopher Immanuel Kant (1724–1804) is one of the best-known deontological philosophers.
        i. According to Kant, there are absolute rules that must never be broken (known as his categorical imperative).
    e. Example: a deontological approach could be helpful if a paramedic is reluctant to treat a patient who is known to have killed a police officer. A duty-to-act mentality would have the paramedic provide treatment independent of personal feelings.
5. Relativism
    a. Often referred to as cultural relativism; founded on subjectivism or ethical subjectivism
    b. Subjectivism is the idea that right/wrong judgments are based on nothing more than each person's feelings on the matter.
6. Ethical reasoning
    a. Should start with an assessment of the facts surrounding an issue
        i. Some facts may not be truly pertinent, or all the facts may not be known.
    b. Impartiality dictates that each person's interest in a matter should be equally important.

c. No person or group should receive special consideration or treatment over any other person or group.

7. Virtue ethics
   a. Sometimes known as Aristotelian ethics, offers a pragmatic approach to real-world ethical challenges
   b. To address the limitations of the consequential and deontological ethical theories, some philosophers have suggested returning to the teachings of the Greek philosopher Aristotle (384 BC–322 BC).
   c. Virtue ethics is concerned with character development of the individual agent or actor; it focuses on the type of person one should strive to be.
   d. According to Aristotle, people are not born virtuous, nor does a virtuous character develop simply through age and maturity. Instead, it develops from practicing right behavior until it becomes a habit.
   e. Aristotle believed there are four cardinal virtues:
      i. Prudence: ability to distinguish actions that are either right or appropriate from actions that are not right or less appropriate
      ii. Justice: affording each person his or her rights
      iii. Temperance: practicing self-control, restraint, or moderation
      iv. Fortitude: courage or endurance, particularly in the face of adversity
   f. Other possible virtues include compassion, respectfulness, patience, tolerance, trustworthiness, and honesty.
   g. Cons of virtue ethics:
      i. Philosophers may disagree about which character traits are virtues.
      ii. Philosophers may contend that different cultures embody different virtues.
      iii. When two or more virtues are in conflict, there is no process for determining which virtues should be given priority.
   h. Virtue ethics recognizes that all people are connected, and for any person to live well and be happy, that person must ensure the same state for others; in fact, the happiness of others must come first.
   i. Unlike other ethics theories, virtue ethics not only prescribes what one ought to do, but also indicates what one ought *not* to do through the description of vices.
   j. Aristotle claimed virtue requires striving for the middle ground; that is, avoidance of extremes, or vices.

8. Respect for patient's autonomy
   a. Health care workers must not only commit themselves to ethical conduct, they must also respect the values held by each person they encounter, including the autonomy of each person.
   b. Autonomy: right of a person to make informed, uncoerced decisions about his or her body
   c. Community paramedics must consider objectively the autonomous choices of patients, particularly those from different cultures.

d. Community paramedics must suppress their own sense of self so as to develop a better awareness of the patient's needs and choices.
e. Avoiding paternalism
    i. Paternalism is any act that limits a person's autonomy or liberty.
    ii. The health care worker likely believes he or she is acting out of beneficence—that is, acting in the patient's best interest.

III. Practical Application of Ethics

A. Case review

1. Community paramedics may have the opportunity to contemplate and debate ethical dilemmas during case reviews.
    a. An integral part of both continuing education and quality assurance
    b. Offer the opportunity not only to evaluate medical treatment or adherence to protocols, but also to review ethically challenging scenarios

B. Practical application

1. As community paramedics study the theories of ethics, they develop theoretical wisdom. To develop practical wisdom, however, they must gain practical experience.
2. Community paramedics studying ethics should begin by following a process to avoid missing steps and to ensure positive outcomes.
3. Three approaches:
    a. Use a stepped process to achieve a thorough evaluation of an ethical dilemma.
    b. Use one of several strategies discovered from research exploring why some people are comparatively successful in maintaining integrity with their values.
        i. Delay a decision (consider when possible)
        ii. Discussion of possible issues and scripting a potential response (preferred)
    c. Understanding the purpose and usefulness of organizational values
        i. Synchronization of values: aligns all employees, serves as a tool of empowerment
        ii. Employees of organizations that deliberately and regularly emphasize their values are better skilled at ensuring a positive customer experience.

Post-Lecture

Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (**date to be determined by instructor**).

B. Read Chapter 6, "The Role of the Community Paramedic in Public Health," for the next class session.

Chapter 6
The Role of the Community Paramedic in Public Health

Unit Summary

After students complete this chapter and the related course work, they will be able to explain the differences between public health, community health, and population health, describe the factors that affect the health of a community, and identify current public health promotion initiatives in the United States, including *Healthy People* and the National Prevention Strategy. Additionally, they should be able to describe the activities of public health agencies at the federal, state, and local levels and describe the role of the community paramedic in supporting public health initiatives.

Objectives

1. Explain the differences between public health, community health, and population health. (p 62)
2. Describe the factors that affect the health of a community. (pp 62-63)
3. Identify current public health promotion initiatives in the United States, including *Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention* and the National Prevention Strategy. (pp 63-66)
4. Describe the activities of public health agencies at the federal, state, and local levels. (p 67)
5. Describe the role of the community paramedic in supporting public health initiatives. (pp 68-71)

Readings and Preparation

- Review all instructional materials including ***Community Health Paramedicine***, Chapter 6, and all related presentation support materials.
- Review local protocols relating to public health, community health, and population health, factors that affect the health of a community, public health promotion initiatives and the National Prevention Strategy, activities of the public health agencies at the federal, state, and local levels, and the role of the community paramedic in supporting public health initiatives.

Support Materials

- Lecture PowerPoint presentation

Enhancements

- Direct students to visit Navigate 2.
- Provide copies of local protocols.

Unit Activities

Writing assignments: Instruct each student to put together a scenario for the role of the community paramedic in public health.

Student presentations: Divide students into groups. Instruct each group to act out the scenario for the role of the community paramedic in public health (developed for the writing assignment) for the rest of the class.

Group activities: Discuss and critique each student presentation as a group. Discuss problems regarding the differences between public health, community health, and population health, the factors that affect the health of a community, current public health promotion initiatives in the United States, the activities of public health agencies at the federal, state, and local levels, and the role of the community paramedic in supporting public health initiatives.

Pre-Lecture

You are the Community Paramedic

"You are the Community Paramedic" is an opening case study that encourages critical thinking skills.

Instructor Directions

1. Direct students to read the "You are the Community Paramedic" scenario found a the beginning of Chapter 6.
2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question.
3. You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. Public health agencies

1. Public health agencies address the shared needs of the community.
2. The community paramedic will encounter and assist in addressing:
   a. Individual needs
   b. Shared needs

II. Public Health

A. What is public health?

1. The term public health refers to the actions that society takes to ensure the health of the community.
2. The public health system is the organizational mechanism for providing such actions.
3. Community health refers to the health status of a defined group of people and the actions and conditions to:
   a. Promote their health
   b. Protect their health
   c. Preserve their health
4. Population health refers to:
   a. The health status of people who are not organized and have no identity as a group or locality
   b. The actions and conditions to:
      i. Promote their health
      ii. Protect their health
      iii. Preserve their health
5. Community paramedics may play a role in community health actions in partnership with other members of the public health system.
   a. Community paramedics generally come from the community they serve so they have a high degree of cultural sensitivity for the population and its needs.

B. Personal health activities versus public health activities

1. Personal health activities are individual actions and decision making that affect the health of a person or his or her immediate family members or friends.
2. Personal health activities may be choosing to:
   a. Eat wisely
   b. Wear a safety belt

   c. Visit the physician
3. Community paramedics may help in these efforts by:
   a. Working with a patient on implementing a food plan
   b. Checking a child safety seat to ensure it was installed correctly
4. Public health activities are activities aimed at protecting or improving the health of a population or community.
5. Some examples of public health activities are:
   a. Maintenance of accurate birth and death records
   b. Protection of the food and water supply
   c. Participation in fund drives for voluntary health organizations such as the American Lung Association

C. Factors that affect the health of a community

1. Factors that affect the health of a community may be:
   a. Physical
   b. Socioeconomic
2. These factors include the ability of the community to organize and work together as a whole as well as the individual behaviors of those in the community.
3. Physical factors include the following influences:
   a. Geography
      i. The community's altitude, latitude, and climate (eg, areas with large mosquito populations)
   b. Community size
      i. The larger the community, the greater its range of health issues and the greater its number of health resources.
      ii. Size can be an advantage or disadvantage.
   c. Industrial development
      i. Can have positive or negative effects on the health status of a community
      ii. Provides added resources for public health programs, but may bring with it environmental pollution and occupational injuries and illnesses
4. Economics can affect the health of a community at national and local levels.
   a. An economic downturn means:
      i. Lower tax revenues
      ii. Fewer contributions to charitable groups.
      iii. Revenue shortfalls
      iv. Budget cuts, reducing health and social services.
      v. Less funding for social programs such as food assistance and public health programs
5. In the private sector, an economic downturn could result in:
   a. Layoffs or reductions in benefits

   b. Less access to primary care services
6. Social norms
   a. Influence can be positive and negative and can change over time
   b. Example: During the 1940s, 1950s, and 1960s, it was socially acceptable to smoke in most settings.
   c. Today it has become socially unacceptable or illegal to smoke in most public places.
   d. Because of this change in the social norm, there is less secondhand smoke in many public places, thus helping to limit the exposure of the public to secondhand smoke over a lifetime.

III. Current Public Health Promotion Initiatives

A. History of public health promotion initiatives

1. Mid-1970s: Greatest potential for saving lives and reducing health care costs in America would be achieved through:
   a. Treatment of disease
   b. Prevention
2. In 1977, the Center for Disease Control conducted a study that revealed that approximately 48% of all premature deaths could be traced to a person's lifestyle or health behavior.
   a. Contributing factors to premature mortality include:
      i. Lack of exercise
      ii. Unhealthy diets
      iii. Smoking
      iv. Uncontrolled hypertension
      v. Inability to control stress
3. This finding led the way for the US government's publication in 1979 of *Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention.*
4. *Healthy People* detailed:
   a. The issues impacting the health of Americans
   b. The role of prevention in improving the health of the national community
5. *Promoting Health/Preventing Disease: Objectives for the Nation* was the first set of health goals and objectives for the nation.
6. *Healthy People 2020* is the fourth edition of these goals and objectives.
7. *Healthy People* includes:
   a. Several overarching goals to provide a general focus and direction
   b. Many supporting objectives used to measure progress within a specified period of time

8. Formal reviews (ie, measures of progress) of these objectives are conducted at 5 years (midcourse review) and again at the end of 10 years.
    a. The midcourse review provides an opportunity to update the document based on the events of the first half of the decade.
9. *Healthy People 2020*, released in December 2010, includes:
    a. A vision statement
    b. A mission statement
    c. Four overarching goals
    d. Almost 600 objectives spread over 42 different topic areas
10. MAP-IT is a critical implementation strategy in *Healthy People 2020.*
    a. Mobilize: Focuses on bringing interested parties together within communities to deal with health issues
    b. Assess: Used to find out who is affected by the health problem and examine what resources are available to deal with the problem
    c. Plan: Goals and objectives are created and an intervention is planned that has the best chances of dealing with the health problem
    d. Implement: Deals with putting the intervention into action
    e. Track: Deals with evaluating the impact of the intervention on the health problem
11. The United States also has its National Prevention Strategy, which was released in 2011.
    a. The National Prevention Strategy was created by the National Prevention Council (NPC) under the Affordable Care Act (ACA).
    b. The goal of the NPC and the National Prevention Strategy is to help lower health care costs through prevention.
12. At the foundation of the National Prevention Strategy are four strategic directions.
    a. Healthy and safe community environments
    b. Clinical and community preventive services
    c. Empowered people
    d. Elimination of health disparities
13. The National Prevention Strategy also has seven targeted priorities:
    a. Tobacco-free living
    b. Prevention of drug abuse and excessive alcohol use
    c. Healthy eating
    d. Active living
    e. Injury- and violence-free living
    f. Reproductive and sexual health
    g. Mental and emotional well-being
14. The National Prevention Strategy also details actions that should be taken by the federal government and its partners, such as:

a. State, tribal, local, and territorial governments
b. Employers
c. Health care organizations, insurers, and clinicians
d. Educational organizations
e. Community groups
f. Faith-based organizations

15. Community paramedicine programs have a role to play in implementing the strategic directions and priorities of the National Prevention Strategy.
    a. Example: By helping a patient with diabetes implement a food plan, a community paramedic can assist the patient in better controlling blood glucose levels and preventing damage to the patient's cardiovascular system, kidneys, and eyes.

B. Community and public health in the early 2000s

1. Early 2000s: Believed that although decisions about health are primarily an individual's responsibility, society has an obligation to provide an environment in which the achievement of good health is possible and encouraged
    a. Many recognize that certain segments of our population whose disease and death rates exceed the general population may require additional resources, including education, to achieve good health.
2. Americans face several serious public health problems, including:
    a. The continuing rise in health care costs
    b. Preventable chronic diseases
    c. Emerging and reemerging communicable diseases
    d. Substance abuse
    e. Disasters, both natural and human-made
3. Health care delivery
    a. In March 2010, significant changes were made to the US health care system when President Barack Obama signed the ACA into law.
    a. Primary focus was to increase the number of Americans with health insurance
    b. The ACA has succeeded in this objective; however, in providing health insurance to millions of Americans who did not have it before, the cost of health insurance went up for many other people.
4. Preventable disease:
    a. The leading causes of death in the United States today are not the communicable diseases that were so feared 100 years ago, but chronic disease.
        i. Prevalence of obesity and diabetes
    b. The four leading causes of death in the second decade of the 21st century are heart disease, cancer, chronic lower respiratory diseases, and stroke.
5. Too many Americans die prematurely due to preventable diseases.

6. Better control of behavioral risk factors alone—such as lack of exercise, poor diet, use of tobacco and drugs, and alcohol abuse—could prevent:
   a. Between 40% and 70% of all premature deaths
   b. One-third of all acute disabilities
   c. Two-thirds of chronic disabilities
7. Health disparities have been defined as the difference in health among different populations.
   a. One of the *Healthy People 2020* overarching goals to eliminate disparities in health among different populations.

IV. Public Health Agencies

A. Public health agencies

1. Public health agencies can be found at the federal, state, and local levels.
2. At the national level, the Department of Health and Human Services is the primary federal public health agency in the United States.
3. Federal public health agencies include the following:
   a. *Agency for Healthcare Research and Quality (AHRQ).* AHRQ is a research support agency. It funds, collects, and publishes research to reduce the cost of health care and improve its quality.
   b. *Centers for Disease Control and Prevention (CDC).* The CDC is a prevention and disease containment agency. The CDC identifies new threats to health, identifies solutions to the causes of death and disability, and helps to prevent disease through education.
   c. *Food and Drug Administration (FDA).* The FDA monitors the food supply for safety and reviews and approves all medications.
   d. *Health Resources and Services Administration (HRSA).* HRSA offers programs that allow qualified people to access primary care services and provides oversight of organ donation programs.
   e. *Centers for Medicare and Medicaid Services (CMS).* CMS oversees the Medicare and Medicaid programs.
   f. *Indian Health Service (IHS).* IHS provides health care services, from preventive services to treatment, to Native Americans.
   g. *National Institutes of Health (NIH).* NIH supports and performs medical research with the goal of preventing and curing disease.
   h. *Substance Abuse and Mental Health Services Administration (SAMHSA).* The goal of SAMHSA is to meet the needs of people with substance abuse issues and people with psychiatric disorders by expanding access to services, improving the effectiveness of preventive efforts, and facilitating rehabilitation.

i. *Office of the Assistant Secretary for Preparedness and Response (ASPR).* ASPR is the point agency that coordinates the planning for and the response to public health emergencies and acts of bioterrorism.

B. State and local public health departments

1. At the state level, departments of public health take on varying roles and have diverse structures.
   a. Example: In Texas, the Department of State Health Services serves primarily as a licensing and regulation agency for health services providers, with little to no local county presence, except for local investigative offices.
   b. By contrast, in Florida, the State Department of Health has program offices in every county in the state and provides everything from immunizations to school nurses to administration of the funds for women's and children's health care.
2. As a community paramedic, you should be aware of the way public health services are provided in your local community to help determine the role the local public health department could play when making referrals.
3. For example, a community paramedic operating:
   a. In Florida would refer patients needing a flu vaccine to the state health department's local county offices
   b. In Texas would refer a patient in need of mental health or substance abuse services to a local nonprofit mental health agency
4. Depending on the local community paramedicine program, the community paramedic may interface with the following local public health resources:
   a. *Epidemiologists* are staff members within the public health department who investigate patterns and causes of disease and injury in the community.
   b. *Case managers* may help patients navigate to health care resources within and partnered with the public health department.
   c. *Patient advocates* work with the patient and the patient's insurer to resolve disputes. They may also work with the patient's employer to resolve any job performance issues tied to the patient's medical condition.
   d. *Mental health providers* are trained to provide care to patients with psychiatric disorders.
   e. *Substance abuse counselors* are trained to provide rehabilitation services to patients with substance abuse issues.

V. The Role of the Community Paramedic in Public Health

A. Serving public health departments

1. The community paramedic may serve as a valuable partner with the local public health department to help the department achieve its community mission.
2. Community paramedics:
   a. Are mobile and do not require a fixed location to deliver services

b. Can provide unique insight into the local community

3. Specific examples of the roles the community paramedic may play include the following:
   a. Participating in community health needs assessments by providing input about local needs, or even canvassing neighborhoods or providing EMS-related geographic data regarding call volumes and types
   b. Delivering health and safety messages from the public health department to local communities in a culturally competent way
   c. Working in health clinics or in rural or remote areas
   d. Providing support services in the event of natural or human-made disasters, such as staffing mobile hospitals or going door to door performing welfare checks

B. Prevention

1. Community paramedics can support public health initiatives in the following ways:
   a. Participating in immunization clinics
   b. Delivering and administering immunizations door to door in medically underserved areas
   c. Conducting new-arrivals visits for first-time parents, including:
      i. Car seat checks or installations
      ii. Home inspections and recommendations to make the home safe for children
      iii. Infant and child CPR training
   d. Conducting safe-at-home visits for older adults, including:
      i. Home safety assessments
      ii. Fall risk assessments and fall prevention education
      iii. Medication inventories
2. Immunization
   a. Public awareness and compliance with suggested immunization schedules, including those for influenza and pneumococcal vaccines, is crucial to creating herd immunity—that is, a broad-based immunity within the community that can prevent the spread of infectious diseases to vulnerable members of the population, such as newborns.
   b. Adequate immunization levels may be achieved by recruiting community paramedics to assist in the education on and administration of vaccines to vulnerable populations, including the pediatric and geriatric populations.
3. Infant wellness checks
   a. General considerations for infant wellness checks include:
      i. Measurements of the baby's length (ie, height)
      ii. Weight
      iii. Head circumference

   b. Wellness checks may include:
      i. Noting developmental milestones
      ii. Considering sleep patterns
      iii. Verifying that immunizations are up to date.
   c. Follow-up care may also include:
      i. Immunization compliance
      ii. Follow-up visits after a visit to the pediatrician
      iii. Assessment of vital signs and well-being as necessary
4. Oral hygiene and dental care
   a. Depending on the scope of the community paramedicine program, the community paramedic may play an important role as an education and resource consultant for those patients who may be at risk due to poor dental hygiene and/or lack of care.
   b. The most vulnerable members of society are often at risk for dental disease due to lack of access to dental care.
   c. According to the CDC, tooth decay is one of the most common diseases of childhood.
      i. Approximately one-third of children aged 6 to 8 years have had at least one cavity or filling, and two-thirds of those aged 16 to 19 years have some sort of tooth decay.
   d. The community paramedic may:
      i. Advocate for such patients and assist them in obtaining access to public or low-cost dental care
      ii. Provide education on oral hygiene and emphasize the importance of regular checkups
5. Falls prevention
   a. One of the community paramedic's concerns is ensuring that the home environment is safe for the patient.
      i. A key concern of older adults is fall prevention.
      ii. Falls are common among older adults, with nearly one-third experiencing such an event each year.
   b. The community paramedic can help to address this public health issue by:
      i. Assessing for potential fall hazards in older adults' homes
      ii. Providing education and strategies to minimize the risks
   c. The community paramedic can help older adults stay independent and reduce their chances of falling by applying the following strategies per local protocols:
      i. Encourage patients to engage in regular exercise, with a focus on increasing leg strength and improving balance.

ii. Review patients' use of both prescription and over-the-counter medications to help identify medicines that might cause side effects or interactions such as dizziness or drowsiness.
iii. Discuss the need for an eye examination by an ophthalmologist, and assist patients in scheduling at least one examination each year. Encourage them to update their eyeglasses as necessary.
iv. Help make patients' homes safer by reducing tripping hazards, adding grab bars where necessary, adding railings on both sides of stairways, and ensuring the house is well lit.
v. Educate patients on proper nutrition, including getting adequate calcium and vitamin D—from food and/or from supplements.
vi. Assist patients in getting screened and, if needed, treated for osteoporosis.
vii. Assess patients' gait and determine if there are difficulties related to ambulation (walking) that warrant further evaluation by a physical therapist. Assistive devices should be available if the patient is having difficulty walking.

d. Further assessment and education regarding injury prevention includes assessment of patients for cognitive impairment.
i. Memory loss and dementia can lead to confusion, dizziness, or poor decision making, putting the patient at risk for falls.
ii. Fall risk factors are outlined in Table 6-3.

e. The plan of care created by the medical director or the patient's primary care physician will be modified based on the community paramedic's observations in the patient's home and how well the patient can navigate within the home environment.

f. Some of the obstacles to safety may be related to:
i. Lack of recognition of the hazards
ii. Lack of knowledge on how to fix the hazards
iii. Lack of resources to make necessary improvements

g. The community paramedic can help the older adult stay safe within the home through:
i. Education
ii. Connecting the patient with needed resources

6. Home safety assessments for older adults and adults with disabilities

a. One concern that can be assessed by the community paramedic is the safety and wellness of the most vulnerable populations in their own homes—older adults and people with disabilities.

b. Community paramedics may play a vital role in:
i. Assessing the individual patient
ii. Assessing the conditions that exist in the patient's home
iii. Reporting on the patient's needs

iv. Assisting in securing the proper resources to help protect the patient's health

c. Simple approaches include:

i. Identifying all safety issues in the home (eg, fall hazards and working smoke detectors)

ii. Addressing activities of daily living that may be affected by the patient's physical or psychological impairment

C. Monitoring

1. The public health department may seek the assistance of the community paramedicine program to monitor the health status of patients experiencing a change in health status either from a short-term or chronic medical condition.
   a. Example: Some public health departments closely monitor patients with tuberculosis.
      i. A strict medication regimen is required to treat tuberculosis and prevent transmission.
      ii. Patients with tuberculosis may be at risk for medication noncompliance for economic or geographic reasons.
      iii. A community paramedic could be requested to visit these patients at home daily, to bring the medications to the patient and ensure medication compliance.
2. General health screening
   a. The community paramedic may play a role in the promotion of routine health screening, such as:
      i. Blood pressure checks
      ii. Cholesterol screening
   b. The community paramedic may be equipped with the tools and trained to perform a screening in the patient's home.
3. Monitoring and managing chronic disease
   a. Community paramedics may visit patients who are unable or unwilling to access facility-based care.

D. Medication compliance

1. Some patients may find it difficult to access, understand, or follow physician-prescribed medication plans.
   a. This problem may be notable among older patients, who are more likely to take multiple medications.
2. The community paramedic can facilitate compliance with medication plans by educating patients on the specifics of their medication's:
   a. Indications
   b. Side effects
   c. Interactions

3. Example: To clarify dosing schedules, the community paramedic may set up a daily organizer and reminder system for the patient.
4. Depending on the scope of the community paramedicine program, the community paramedic may also act as a liaison between health care providers to:
   a. Integrate the patient's care
   b. Help prevent the duplication of prescriptions

E. Navigation to services

1. The patient–provider relationship that develops as the community paramedic visits the patient at home is unique in health care because of:
   a. The amount of time the community paramedic spends with the patient
   b. The number of shared experiences
2. The community paramedic may be able to convince the patient to engage with outreach services that the patient may not ordinarily agree to seek.
3. Outreach services include social services such as:
   a. Meal delivery services
   b. Transportation services
4. Outreach services can provide patients with the tools they need to improve their access to:
   a. Nutrient-dense meals
   b. Facility-based primary care
   c. Health care specialists
5. Outreach services can help patients on the road to self-management and better health, thereby achieving a public health goal of healthier community members.

Post-Lecture

Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (**date to be determined by instructor**).

B. Read Chapter 7, "Social Determinants of Health" for the next class session.

Chapter 7
Social Determinants of Health

Unit Summary

After students complete this chapter and the related course work, they will be able to recognize social determinants and identify the common ones, describe how social ecology identifies the correlation between the social aspects of the patient's environment and their overall health status, discuss how social gradient impacts the health of patients, and describe the role and value of documentation.

Objectives

1. Define social determinants. (p 76)
2. Identify common social determinants; include their impact on the overall health of the community and on patients. (pp 76-83)
3. Describe how social ecology identifies the correlation between the social aspects of the patient's environment and overall health status. (pp 83-85)
4. Describe how to identify environmental determinants of health. (p 85)
5. Describe the role of documentation in developing a plan of care, monitoring patient progress, and helping to secure funding for programs. (pp 85-86)

Readings and Preparation

- Review all instructional materials including ***Community Health Paramedicine***, Chapter 7, and all related presentation support materials.
- Review local protocols relating to the common social determinants, social gradients, environmental determinants, and the role of documentation.

Support Materials

- Lecture PowerPoint presentation

Enhancements

- Direct students to visit Navigate 2.
- Provide copies of local protocols.

Unit Activities

Writing assignments: Instruct each student to put together a scenario to illustrate some of the social determinants of health.

Student presentations: Divide students into groups. Instruct each group to act out a scenario to illustrate some of the social determinants of health (developed for the writing assignment) for the rest of the class.

Group activities: Discuss and critique each student presentation as a group. Discuss problems regarding the common social determinants and environmental determinants of health, describe how the social gradient impacts the overall health of patients, and consider the role of documentation in developing a plan of care and monitoring patient progress.

Pre-Lecture

You are the Community Paramedic

"You are the Community Paramedic" is an opening case study that encourages critical thinking skills.

Instructor Directions

1. Direct students to read the "You are the Community Paramedic" scenario found a the beginning of Chapter 7.
2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question.
3. You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. Social determinants

1. The World Health Organization defines social determinants as the conditions in which people are born, grow, live, work, and age.
2. These determinants are shaped by:
   a. Wealth distribution
   b. Resource availability

   c. Individuals in the community
3. One of the most important aspects of community needs assessment or individual patient needs assessment is identifying those social issues that may play a role in the:
   a. Health of the patient
   b. Overall health of the community
4. Social issues related to health can range from culturally guided behavior practices that impact diet and exercise to socioeconomic constraints such as poverty.
5. By researching and identifying the social aspects of an individual patient's and the community's health, the community paramedic can be better prepared to assist in developing initiatives to address or overcome those social issues.
6. Addressing one social determinant can have a domino effect.
   a. Example: When people find employment, it increases their income, and may give them access to health care, thereby improving their ability to take control of their own and their family's health.
7. Social determinants should be addressed early and at the foundational level.
   a. Example: Identifying patients who frequently contact EMS for chronic health issues, evaluating their home environment and educating them on their health condition can help them to take control of their health situation.

II. Social Determinants of Health

A. Broadening our perspective

1. Social determinants that can affect the community's overall health include:
   a. Religion
   b. Culture
   c. Socioeconomic status
   d. Age
   e. Relationship status
3. When we think of social determinants, we need to broaden our perspective to encompass any and all social interactions people have with their environment.
4. Of all the determinants affecting a person's health, those of a social nature are by far the most fluid.

B. Religion

1. Religion can play an important role in the overall health of a community and in an individual.
2. A patient's religious beliefs or practices may impact his or her health positively or negatively.
3. Since the advent of organized religion, some practices and rituals have had positive effects by promoting and maintaining the public's health.

   a. Example: Hebraic practices of circumcision reduce the potential for infection by human immunodeficiency virus and other sexually transmitted diseases according to the Centers for Disease Control and Prevention.
   b. Example: Practices of quarantining people with diseases such as leprosy were intended to prevent the spread of those diseases to the community.
4. Religious beliefs may play a role in determining when and what types of medical intervention people seek out. Some belief systems have guidelines regarding:
   a. Blood transfusions
   b. Vaccines
   c. Contraception
5. Some belief systems see prayer as the most effective means to healing and encourage their adherents to seek it before, or along with, any medical interventions.
6. In our society, it is every person's right to abide by his or her religious convictions, and we must remember that spiritual care is just as important to some patients as physical care.
7. Religion also affects a person's end-of-life decisions
   a. Medical interventions
   b. Palliative care
8. The community paramedic should be aware of a patient's beliefs and seek to identify what their effects might be both on the individual's health and on the community's overall health.

C. Culture

1. Cultural practices are also important when examining the social determinants that affect a person's and a community's health.
2. Culture is defined as the beliefs, customs, and art of a particular society, group, place, or time. Our focus will be culture as identified in customs.
3. The cultural environment in which a person lives can influence his or her outlook on life.
   a. Today, when food is ever present and easy to access, obesity has become a public health problem.
   b. To complicate this unhealthy trend, a person growing up in a culture that places great emphasis on an unrealistic body size (eg, an unattainably thin waist) may be influenced to make choices that are not healthy in an effort to fulfill cultural expectations.
      i. Anorexia and bulimia
4. Cultural practices include dietary choices.
   a. Some cultures cook and prepare foods that are high in sodium, sugar, or saturated fats.

        i. Excessive amounts of these elements in food have been linked to increased health problems ranging from high blood pressure to cardiovascular disease to diabetes.
    b. Some cultures have a history of healthy food preparation and choices.
        i. Mediterranean diets often have at their center foods that include olive oil, nuts, and other foods that reduce inflammation and benefit the body.
5. Culture may also influence a person's willingness to seek medical attention.
    a. If someone comes from a family that has historically seen health care as something that only "really sick" people need, he or she may wait until symptoms become unbearable before seeking medical attention.
    b. Other people may have grown up in families that highly value health maintenance and checkups.
6. Culture influences the way we make decisions.
    a. Our cultural environment often dictates to us which choices are good and which are bad, in the eyes of our society.
7. A community paramedic who listens to the patient and seeks to identify the cultural influences affecting him or her will have greater success in communicating and working with patients.
    a. As health care professionals, it is the job of the community paramedic to give patients the best information possible to help them make the most well-informed decisions.
        i. Example: A community paramedic may have to explain to a diabetic that although his father lived to 80 without going to a doctor, heredity only plays a part. Each person's health is unique.

D. Social and economic status

1. Social and economic status is the most commonly discussed social factor affecting a person's health.
    a. Socioeconomic status refers to a person's financial capacity, educational level, and/or work status.
2. Socioeconomic factors that can have an effect on a person's health include:
    a. Social exclusion
    b. Housing and water
    c. Education
    d. Employment
    e. Transportation
3. Social exclusion
    a. Measured more by subjective means than by hard data
    b. Phenomenon by which a person, or group, is excluded from social interaction with those in the community
    c. When social exclusion results from racial, ethnic, or cultural discrimination, people may not be able to access health care.

d. Social margin: people who are on the fringes of the social system and often have an unequal access to health care
e. People who are more likely to be marginalized:
    i. Homeless
    ii. Mentally ill
    iii. History within the penal system
f. Poverty: social exclusion can also be the result of absolute or relative poverty.
    i. Absolute poverty: the lack of basic material necessities for life, including health care
    ii. Relative poverty: living on less than 60% of the national median income
g. People who are impoverished may be unable to access even free community health services due to lack of transportation, odd working hours due to multiple jobs, or an inability to find or coordinate child care.
h. Social exclusion, if unchecked or unchanged, ultimately leads to an unequal distribution of, or at least unequal access to, health care and other resources. It can cost lives.
i. People at the lower end of the social gradient are often unable to access basic health care services due to financial issues.
    i. Those lower on the social gradient are often at higher risk for life-threatening diseases, injury, or other health-related issues.
    ii. The decline in health of a person who remains on the lower end of the gradient is often exponential (eg, if a person with high blood pressure is unable to access resources to control it, it can easily compound to the point of a stroke or even death).
j. By assisting people at the lower end of the gradient in accessing proper health care services, the community paramedic could potentially have a large effect not only on the patient's short-term health, but also on his or her long-term health.

4. Housing and water
    a. Housing is a shelter and form of protection against environmental elements.
    b. Adequate housing impacts more than just basic comfort; it can also have ramifications on a person's health.
    c. Housing provides access to many of the basic services needed to ensure proper health:
        i. Clean water
        ii. Sanitation
        iii. Waste disposal
        iv. Shelter
    d. Clean water is essential to proper health and hygiene
        i. Proper food preparation
        ii. Sanitization

e. Improper hygiene can lead to increased rates of infection and other health-related issues such as:
    i. Flu
    ii. *Staphylococcus* infections
    iii. Common cold
f. Improper waste disposal can create:
    i. A breeding ground for rodent vectors
    ii. An accumulation of toxic or hazardous substances
g. Contaminants can easily enter into water systems and create a higher risk for the general population to contract:
    i. Diarrhea-causing illnesses
    ii. Parasites
    iii. Cancer
h. Recent surveys by the US Census Bureau show that approximately 630,000 households, or 1.6 million Americans, live in housing with inadequate or no access to indoor plumbing or running water.
i. The home visit assessment is not a mechanical inspection of the home. It is designed to focus on common causes of injury, such as:
    i. Trip hazards
    ii. Kitchen safety
    iii. Adequate lighting inside and outside of the house
    iv. Grab bars and lift handles in bathroom if needed
j. During the first home visit, the community paramedic can evaluate the home setting to identify items that can be immediately corrected without the need for any additional resources.
k. Homes with large amounts of dust, mold, lead paint, cockroaches, and rodents can create environments that exacerbate health issues in people with chronic respiratory diseases.

5. Education
    a. Can be an important contributor to a person's health and well-being
    b. Equips people to be involved in various productive activities in society
        i. Those with a high school diploma have a much greater chance of being employed than those who do not complete high school.
        ii. Those who continue on to obtain an undergraduate and postgraduate education tend to obtain higher-paying jobs, which can lead to obtaining employee health insurance or the ability to purchase private health insurance.
    c. Education also empowers people with critical thinking skills, enabling them to make better choices, specifically in regard to health.

i. Increased access to education has been associated with longer life expectancy, improved health and quality of life, and health-promoting behaviors.

d. Good health education can be just as important as good general education.
   i. Even people at the lower end of the education social gradient can be empowered to take control of their health.
   ii. Example: many diabetic-related emergencies that require EMS assistance could be avoided by educating patients on proper diet, eating schedules, insulin use, and blood glucose measurement.

e. Educating the patient on his or her health condition and ensuring that the patient has received and understood the message can go a long way in improving patient health.

6. Employment
   a. Employment is closely linked to and often associated with the educational social determinant.
   b. Being employed can have a positive impact on a person's overall health.
   i. People who are employed often find themselves further up on the social ladder, which tends to positively impact their overall health condition.
   ii. Employment also improves people's likelihood of having access to health care services and resources (eg, employer-based health care programs).
   c. However, overall work environment can play a large role in person's health.
      i. Increased stress levels at work
      ii. Length of the commute
      iii. Length of the shift
      iv. Wages
      v. Shift schedule
      vi. Physical work environment
   d. While employment can have both positive and negative effects on a person's health, the effects of unemployment are often purely negative.
   e. Unemployed people and their families are at a greatly increased risk of:
      i. Premature death
      ii. Significant health issues
      iii. Negative feelings about themselves (eg, not able to provide for their families)

7. Transportation
   a. When we think of transportation as a social determinant of health, we are focusing on the role that transportation plays in affecting our environment.
      i. Increase in motorized transportation led to decrease in manual transportation (ie, people walk less)

ii. Walking to the grocery store or to the nearest bus stop to use public transportation increases the level of physical activity in a country where obesity is on the rise.

b. Transportation systems also have an effect on the cost of goods and services.
   i. For people on a fixed or very limited income, any increase in the cost of goods and services can have a negative effect on their ability to maintain a diet that supports proper health.
   ii. Increases in food prices have even caused some families with low- and midlevel incomes to fall into the poverty end of the social gradient.
   iii. When people fall into this end of the social gradient, not only is their health affected due to poor diet but they also enter into the arena of health risks caused by poverty.
   iv. This is a prime example of the extreme fluidity of the social determinants of health.

E. Age

1. Age can play an important role in a person's health. At the extreme ends of the age spectrum, people are often dependent upon others to help them access health care.
   a. Young children
   b. Older population
2. Age is often associated with increased risk of disease.
   a. Infants, young children, and older adults are at higher risk for infectious diseases.
   b. This is why each year these groups are encouraged to receive vaccinations for certain diseases.
3. As a community paramedic, keep in mind how age affects your patient's ability to handle illness or injury and access necessary health care.

F. Relationship status

1. Ideally, every person has someone on whom he or she can rely in times of need.
2. Such relationships are very important to a person's health. A person may need someone to:
   a. Drive them to the physician or the pharmacy
   b. Assist them with taking their medications
   c. Care for them while they recover from a procedure
3. In the case of marriage, or similar shared-living situations, two people means two incomes, which can determine where a person or family falls on the social gradient.
   a. Combined incomes may allow for at least basic services
   b. Employer may offer health insurance to cover family members
4. It is important to note that relationship status extends beyond significant others.

5. A community paramedic must examine the patient's entire social safety net.
   a. Friends
   b. Other family members (nieces, cousins)
   c. Community of faith

III. Identifying Social Determinants

A. Social ecology

1. Field of study that emerged in the mid-1960s and early 1970s that focuses on the social contexts of humans' interactions with their environment
2. Seeks to identify the correlation between the social aspects of the person's environment and the person's overall health status
3. Data required for this research are collected by the community health team during both the patient and the community needs assessments.
4. The information from both the patient and the community needs assessments is evaluated and used by the community health team to develop communitywide health programs to address the issues identified during the research and subsequent evaluations.
5. There are other factors that contribute to the community's and the patient's overall health, including geographic dimensions and environmental dimensions, but the social dimension is often the most fluid and difficult to address.
6. The social-ecological model focuses on four overall dimensions of interaction:
   a. The person as an individual
   b. The person's close relationship with others
   c. The person as a member of a community
   d. Societal influences on the person

B. The person as an individual

1. This dimension focuses on the person's environment and history.
2. This information is collected during the patient needs assessment.
3. The community paramedic seeks information related to the patient's personal situation.
   a. Where does the patient fall on the social gradient?
   b. What biologic factors are present that could affect the person's health?
   c. Is there a history of chronic health diseases?
   d. Do any immediate family members have the same ailments?
   e. What about the patient's diet? What type of foods is the patient eating? Is it a balanced diet?
   f. While exploring this dimension, the community paramedic may also inquire about the patient's religious and cultural beliefs.

4. At this level, interventions include educating patients on the condition(s) impacting:
    a. Health
    b. Healthy diet
    c. Additional preventive measures
    d. Example: a patient needs assessment may identify that a patient with diabetes does not understand how blood glucose levels impact overall health.
    e. The community paramedic may determine that educating the patient on ways to maintain blood glucose levels through proper diet and exercise is the best course of action.

C. The person's relationships with others

1. This dimension focuses on the person's close interactions with friends and family.
2. This information is collected during the patient needs assessment.
    a. Are there relationships that are having an effect on his or her overall health?
    b. Are there unhealthy relationships that are causing undue stress?
    c. Are there domineering relationships that are keeping the patient from taking control of his or her own health condition?
3. At this level, interventions are more within the realm of:
    a. Counseling
    b. Educating the family
    c. Empowering the patient to take control of his or her environment
    d. Example: if the patient needs assessment identifies that a family member makes all the health-related decisions for a nonverbal adult patient, the community paramedic may determine that the best course of action is to educate the family member regarding the patient's condition.

D. The person as a community member

1. This dimension focuses on the person's interaction with the larger community
2. This information is also collected during the patient needs assessment and contrasts with information about the community.
3. At this level, a deeper exploration can be made into the general environments of:
    a. School
    b. Workplace
    c. Neighborhood
    d. Other relevant settings, with special consideration to how the person relates within these settings.
        i. Is the problem isolated to just the patient or is there a larger, communal aspect to the issue?
        ii. Does the patient have social interactions or is there evidence of social exclusion?

iii. Are there cultural issues within the local community that are having an effect on the patient?

4. At this level, intervention could include suggesting changes to enhance or alter the patient's interaction with the community or finding a new community for the patient to interact with.
    a. Example: Community paramedic may help an older patient get involved with the local Council on Aging or a Meals on Wheels program to increase social interaction.

E. Societal influences on a person

1. This dimension examines the overall societal pressures placed on the person.
2. This information can be evaluated during both the patient and the community needs assessment.
3. Culture and stereotypes are the primary subjects addressed at this level.
4. Questions to consider include the following:
    a. What message is society sending this person that could be affecting his or her health, or at least his or her behavior?
    b. Are there any societal barriers keeping the person from accessing education or health care?
5. In the societal dimension, the only interventions are often sweeping, broad-spectrum policy changes at the government level.

F. A brief example

1. Utilizing social ecology, the community health team can gain an understanding of the unique role that social determinants play in community health.
2. A community health team can get a broad picture of both the individual and community by:
    a. Evaluating the four domains
    b. Comparing data from both patient needs assessment and community needs assessment
3. Example: The community health team may identify through social-ecological research that a portion of their community that suffers from chronic high blood pressure also engages in cultural dietary practices that involve consuming foods high in sodium.
    a. Through the team's research, they have identified a social determinant of the overall health of a portion of their community.
4. In our example:
    a. The community paramedic may serve as a liaison with the patient, referring information about the dietary habits of the patient's family back to the community health center.
    b. The community health center may be able to take this information and access resources, such as a nutritionist, to assist the community paramedic in treating the patient.

c. Hospitals may be able to assist by providing low-cost services or community-based programs (eg, cooking classes that demonstrate how to modify family recipes to meet health needs).

IV. Environmental Determinants

A. Another determinant of health is the environment in which a person lives.

1. It is suggested that 24% of the world's disease issues and 23% of all deaths can be attributed to the environment.
2. Environmental determinants are the physical conditions that affect how people live and interact with their community.
3. Include:
   a. Air quality
   b. Water quality
   c. Urban degradation
   d. Climate change
4. Environmental determinants can have an immense impact on the health of a person, especially those on the lower end of the social gradient.
5. One example cited is the rise of childhood asthma.
   a. Prevalence of the disease has greatly increased over the past decade in children 0 to 5 years of age.
   b. Children living in environments with large public transit systems or near industrial areas with higher concentrations of smoke are at an increased risk for developing asthma.
   c. A family that is already struggling to meet its health care needs may be overwhelmed by this added strain, and the child's needs may go unmet.
6. Urban degradation, or urban blight, has also been shown to have an adverse effect on the health of people and communities.
   a. Degrading buildings often pose risks to those around them
      i. Lead paint or asbestos insulation
   b. These degrading buildings are often a source of low-cost housing; thus they attract families and other people who are lower on the social gradient, exposing them to environmental hazards.

B. Identifying environmental determinants

1. Environmental determinants can be identified during both the patient and the community needs assessments.
2. Community paramedics should pay close attention to the physical community in which a patient lives and ask the following questions:
   a. Is there evidence of environmental degradation?
   b. What industries are close by?

c. Does the area have a history of high pollution? If so, research the area and identify what health patterns are associated with it.

3. During the patient needs assessment, evaluate the immediate environment in which the patient lives. Survey the home, and consider the following:
   a. What is the condition of the home?
   b. Where is the home located?
   c. How close is the home to a health care facility?
   d. Does the home have a clean water source? Does the potential exist for contamination of the water source?
   e. Does the home appear to be structurally sound?
   f. Is the house well insulated or does it feel drafty?
   g. Could the house contain asbestos or lead paints? The presence of lead paint is a greater possibility in houses built before 1978.

V. Documentation

A. Documentation provides the foundation for the development of treatment plans, and it serves as a means to evaluate and improve upon those plans.

1. The documentation process may start with the initial referral to the community paramedic.
2. The community paramedic will then visit the patient and conduct a patient needs assessment.
3. The patient needs assessment includes an evaluation of the patient's:
   a. Physical environment
   b. Social interaction
   c. Income level
   d. Employment
   e. Disabilities
   f. Relationships
4. In conjunction with the patient needs assessment, the community paramedic may need to reference a community needs assessment.
5. This information, which can often be accessed through community-based health systems, includes:
   a. Any common health issues among the community
   b. Rates of mortality and morbidity in the community
   c. Overall ability to access health care communitywide
6. Together these two assessments will assist the community paramedic and the overall community health team in determining what exactly is affecting the patient's health and how best to develop a plan of care to assist the patient.

7. Documentation of each patient visit and notation of improvements or setbacks play an important role in monitoring the overall effectiveness of the treatment program.
    a. If you have data showing that your interventions are working to improve the overall health of patients and their communities, you have a good platform from which to request grants or public funding to continue or increase your efforts.

VI. The Social Aspect of Public Health Policy

A. Several public health initiatives have been enacted in an effort to address health disparities.

1. Initiatives at the local level:
    a. Public health education regarding safe sex and abstinence to address sexually transmitted diseases
    b. Free blood pressure and diabetes screening clinics
    c. Classes on proper diet and exercise
2. Policy initiatives to address the social dimensions of health at an early age have included:
    a. School nutrition programs
    b. Drug education programs
    c. Sexual health education in high schools
    d. Continuance of physical education in schools
    e. Increased focus on literacy levels
3. At a broader societal level, initiatives such as unemployment benefits and low-cost health care clinics have been established to address the social dimension of health and help people gain access to health care services that they might not otherwise have been able to access.
4. One of the most recent and well-known initiatives is the Patient Protection and Affordable Care Act of 2010 (PPACA).
    a. This attempt at a major overhaul of the health care system focuses on making health insurance and access to health care available to virtually all members of society.
    b. While some aspects of the laws have resulted in increased access to care for some patients, other patients have been negatively impacted.
    c. Be aware that some patients who had access to care prior to PPACA have lost access to important aspects of their health care that were previously affordable for them.

Post-Lecture

Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (**date to be determined by instructor**).

B. Read Chapter 8, "Cultural Competence," for the next class session.

Chapter 8
Cultural Competence

Unit Summary

After students complete this chapter and the related course work, they will be able to describe how cultural beliefs may impact a person's health and how the person accesses health care, define cultural competence and explain why it is a critical skill set for community paramedics, and discuss how the community paramedic can tailor a style of interaction according to the needs of the audience to ensure effective communication and culturally appropriate health services.

Objectives

After reviewing this discussion, you will be able to do the following:

1. Explain why culture is a broadly understood experience. (p 91)
2. Describe how cultural beliefs may impact a person's health and how the person accesses health care. (pp 91-92)
3. Define cultural competence, include why it is a critical skill set for community paramedics. (pp 92-94)
4. Describe how a community paramedic can learn and practice cultural competence. (pp 94, 96-97)
5. Identify the risks of stereotyping and over-attribution. (pp 94-96)
6. List the four dimensions of culture, include a description of each. (pp 97-100)
7. Describe how health care can be delivered with an awareness of cultural impacts. (pp 97-100)
8. Discuss how the community paramedic can tailor a style of interaction according to the needs of the audience to ensure effective communication. (pp 97-100)

Readings and Preparation

- Review all instructional materials including ***Community Health Paramedicine***, Chapter 8, and all related presentation support materials.
- Review local protocols relating to culture, cultural competence, the four dimensions of culture, and tailoring a style of interation to the needs of the audience.

Support Materials

- Lecture PowerPoint presentation

Enhancements

- Direct students to visit Navigate 2.
- Provide copies of local protocols.

Unit Activities

Writing assignments: Instruct each student to put together a scenario for cultural competence.

Student presentations: Divide students into groups. Instruct each group to act out cultural competence (developed for the writing assignment) for the rest of the class.

Group activities: Discuss and critique each student presentation as a group. Discuss problems regarding culture, the community paramedic's apparent approach to the patient, etc.

Pre-Lecture

You are the Community Paramedic

"You are the Community Paramedic" is an opening case study that encourages critical thinking skills.

Instructor Directions

1. Direct students to read the "You are the Community Paramedic" scenario found a the beginning of Chapter 8.
2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question.
3. You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. Today's health care professionals must be able to navigate across cultures.

1. The people with whom we work and serve come from increasingly diverse backgrounds.
2. The skill set needed to function effectively across cultures is often referred to as cultural competence.
3. The aim is to increase our ability to reach across areas of cultural difference.

II. Culture

A. The first step toward understanding culture is to define culture.

1. Historically, culture was thought of as a line between those who were "civilized" and those who were not.
2. Labeling some people as "uncivilized" led to stereotyping, the overgeneralized depiction of a thing, individual, or group that plays on undesirable associations.
3. Today, a person's culture is often regarded through elements such as language and modes of communication, dress, food, and religion.
    a. This definition of culture can also be associated with values.
    b. Following this line of thought, people sometimes worry that there are no absolute truths and that everything is relative.
        i. Example: Female genital mutilation could be justified as a "cultural tradition" under such a view.
    c. Does a person's culture necessarily determine what is right for him or her?
    d. How can culturally appropriate health services be delivered to a diverse population?

B. Definition of culture

1. Marshall Singer outlines it as "a pattern of perceptions, values, attitudes, and beliefs that are accepted and expected by an identify group."
2. Culture is the experience of similarities and differences among people.
3. Humans compare and contrast their own behaviors and beliefs to those of others and determine whether the other people are in "other groups" or in "our own group."
    a. For example, a passerby and a paramedic may witness the same thing—a person with a head contusion—but interpret the scene and act differently.
    b. Those who appear quite dissimilar may find areas of agreement, while others who seem more similar may have important differences.

III. Cultural Impacts on Health Care

A. The perception and maintenance of physical health constitute a major differentiation between groups and countries.

1. Some experts identify "health systems," or how cultures view what is wellness and health, as one of the major concepts in understanding how culture can impact a person's health.
    a. Effect of a culture's view on health care is witnessed in issues ranging from what constitutes appropriate human immunodeficiency virus (HIV) prevention measures to what efforts governments should make toward socializing their medical systems.
2. When responding to a call, community paramedics must recognize that the people they encounter bring with them:
    a. Values related to health care and treatments
    b. Memories of past interactions (both positive and negative) with medical personnel
3. The North American belief that physical or physiological conditions are of a biological nature and can be treated as such is not universally shared.
    a. Some patients may also seek:
        i. Help from faith-based resources
        ii. Remedies that are nonmedical, homeopathic, or culturally traditional

IV. Cultural Competence

A. Knowledge, skills, and attitudes (components of cultural competence)

1. As it relates to a medical environment, cultural competence is the ability to provide care that:
    a. Incorporates an understanding of the patient's preexisting views about his or her condition
    b. Demonstrates an appreciation for beliefs and practices that are dissimilar to those of the medical provider
2. Being culturally competent means the community paramedic has:
    a. *Knowledge*: General information and a specific understanding of self and other cultures, including the various views on health, disease prevention, and treatment
    b. *Skills*: Practical ability, behaviors, and modes of communication that help in interacting with patients from another culture
    c. *Attitudes*: Effective approaches that both demonstrate a belief that a person can make a difference and express an interest in reaching across cultural divides to provide care
3. Cultural competence is more than a cognitive ability to learn and know about other cultures.

   a. Should be holistically understood
   b. Regardless of the task you are performing, your attitude is vitally important.
      i. "Bedside manner" or patient-centeredness
4. In the language of customer service, cultural competence might be expressed as making the customer feel valued.
   a. If you are sincere and respectful, your patient will pick up on your good attitude and intentions.

B. The imperative for cultural competence

1. Why is cultural competence so important in today's health care environment?
2. There are at least three imperatives to consider:
   a. To respond to current and projected demographic shifts (population is older and more racially diverse)
   b. To decrease the likelihood of marginalizing patients during patient-provider interactions
   c. To use our work environment as a setting to model and adapt professional conduct

C. Increasing your cultural competence

1. Learn more about self-awareness and the dimensions of culture.
   a. Identify your own values and experiences.
2. Perform self-assessment to identify your preferences, biases, and overall cultural competence.
   a. Intercultural Development Inventory
   b. Harvard Implicit Association Test
3. Gain experience working in a variety of medical settings with a variety of people.

V. Examining Your Culture

A. We are all composites of our cultural influences.

1. To identify cultural differences in others, we must look at ourselves as the starting point of comparison.
2. Identifying the influence of cultural components such as your age, gender, or class will help you reach across differences.
   a. Example: The approach of a younger female community paramedic interacting with an older male patient may be different than if she were a middle-aged male community paramedic.

B. Iceberg analogy

1. The iceberg analogy is a way to show that much of what impacts us lies under the surface.

   a. When we meet someone, we see physical appearance and outward behavior, but we do not get the full picture of what experiences or values have shaped them.
   b. It is only through their behaviors that they express their personality.
   c. Surface culture (external items such as dress, spoken and body language, and food) versus deep culture (attitudes, opinions, and values)
2. The iceberg analogy also points out that although two people may appear similar, they may have quite different worldviews.
3. Our minds take in what we can quickly discern, such as superficial observations about a person we meet, and then make judgments or categorize based on this limited information.
4. Be on guard for over-attribution: the process of correlating what we view as negative behaviors seen in others to:
   a. The most noticeable different trait between them and ourselves (eg. race, gender, age, and body type)
   b. Stereotypical cultural qualities
5. The iceberg analogy can be used to analyze how you see others, but it is also a valuable tool when thinking about how you might be perceived by a patient or coworker.
   a. Examples of "above the surface items": How you dress and speak (tone of voice), age, gender, and race

C. Overtly identifying your values

1. An awareness of your values and preferences is a valuable tool that can be used to understand people dissimilar to yourself.
2. Specific behaviors result from internally held values.
   a. Example: Someone who does not value prosperity will not be driving the latest model of car.
3. Unconscious influences in North America include the values of:
   a. Timeliness
   b. Innovation
   c. Individuality
   d. Equality
   e. Directness
4. North Americans tend to value being assertive, but this is not a universal value.
   a. In North America, we say, "The squeaky wheel gets the grease."
   b. A Chinese idiom is, "The nail that stands up, gets pounded down."

VI. Observing Versus Evaluating Others

A. Honestly examining ourselves better prepares us to engage with those we will encounter while working in community paramedicine.

1. We are often programmed to immediately evaluate (with categories such as good/bad, right/wrong, and attractive/distasteful) information taken in by our senses.
2. The Describe, Interpret, Evaluate (D-I-E) Model is a three-step tool that can be used by the community paramedic to:
   a. Help slow down and avoid making snap judgments
   b. Help identify what we are actually witnessing
   c. Make a wider range of potential inferences
   d. Provide more accurate evaluations
3. Example: On a call in which we encounter a strange or difficult situation, the D-I-E Model suggests that we first try to:
   a. Describe what we see or hear
   b. Think through more than one possible interpretation of what we saw or heard (take time to brainstorm)
   c. Base our evaluations on that list of possible interpretations
4. Example: In the classroom, Mandy is leaning forward in her chair and typing on her laptop. Is she listening and taking careful notes? Instant messaging a friend? Completing an assignment?

VII. Dimensions of Culture

A. Dimensions of culture are used to make comparisons between cultural groups.

1. The method:
   a. Identifies a specific attribute
   b. Compares the importance or prevalence of this attribute to its place within the broader culture
   c. Contrasts to what degree the attribute appears in a particular culture
2. The dimensions are often more useful to understand differences than to determine what someone from a "rural," "Hispanic," or older adult cultural group may value.
3. We will highlight four dimensions of culture: individualism, power distance, masculinity, and conflict style.

B. Individualism

1. Identified through the research of Geert Hofstede, who compared the extent to which people are assimilated into groups

2. The spectrum runs between the poles of individualism and collectivism (autonomous achievers versus those who see themselves as part of a group).

C. Power distance

1. Also identified by Hofstede, power distance is the degree of respect and the acceptance of unequal power among people.
    a. In cultures with a high power distance, some people are regarded as superior to others because of their social status, gender, race, age, education, birth, personal achievements, family background, or other factors.
    b. Cultures with low power distance tend to assume equality among people and focus more on earned status than given status.
    c. In general, the more unequally wealth is distributed, the higher the power distance is.
    b. This dimension can also be viewed as occurring along a spectrum, meaning a person can be anywhere between the two poles.
    c. Community paramedics working in a setting where people with a higher power distance orientation may be seen as a figure of power or status.

D. Masculinity

1. The third cultural dimension observed by Hofstede, masculinity refers to how male and female roles are perceived.
    a. Those from a high masculinity orientation believe that men should be dominant and women subservient; a lower masculinity orientation reflects less gender hierarchy and a sharing or roles and responsibilities.
    b. Where a person is on the spectrum dictates how he or she believes:
        i. Each gender should behave
        ii. How the sexes should interact with each other

E. Conflict style

1. The Intercultural Conflict Style (ICS) Model is a model of conflict orientation that highlights:
    a. How much or how little we show emotion
    b. To what degree we express our disagreement
2. Some people may choose to express their full feelings during a disagreement through words and tone of voice, while others keep their emotions hidden inside and always appear calm.
3. The ICS can be mapped using four quadrants and two spectrums:
    a. Discussion: represents people who speak directly and keep their emotions in check
    b. Engagement: represents people who fully express their emotions and also speak directly
    c. Dynamic: represents people who value expressing emotion, but not always in direct correlation with their point of view

   d. Accommodation: represents people who have been taught to not "lose their cool" or to be too blunt; more likely to give a hint or tell a story and assume the other party understands their meaning

4. No one conflict style is better than the others. As a community paramedic, you will encounter people who express a range of emotions and different degrees of directness.

VIII. Communicating Across Multiple Languages

A. English as a second language

1. Differences in grammatical structure, idioms, and the multiple accents of native English speakers are obstacles to understanding health care providers.
2. Patients may not communicate in a second language as well as in their native tongue.
3. Establishing a relationship of respect and trust is vital.

IX. Community Health Paramedicine as Customer Service

A. One way to frame the concept of cultural competence is through the idea of providing good customer service.

1. As a paramedic, you are already skilled at providing high levels of customer service to patients for 10 to 30 minutes at a time, multiple times a shift.
2. As a community paramedic, you will expand your customer service skills with your patients over multiple visits and over longer periods of time.

Post-Lecture

Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (**date to be determined by instructor**).

B. Read Chapter 9, "Community Needs Assessment," for the next class session.

Chapter 9
Community Needs Assessment

Unit Summary

After students complete this chapter and the related course work, they will be able to describe the purpose of a community health needs assessment, identify components of a community map, explain how statistics that populate a community map are collected, and discuss the purposes of a health care delivery system gap analysis and a community resource capacity assessment. Additionally, the students should be able to describe how the community paramedic uses the community health needs assessment, the health care delivery system gap analysis, and the community resource capacity assessment to provide patient care.

Objectives

1. Describe the purpose of a community health needs assessment. (p 105)
2. Describe the purpose of a community map. (pp 105-106)
3. Explain how the statistics that populate a community map are collected. (pp 106-111)
4. Identify the purpose of a health care delivery system gap analysis. (p 111)
5. Describe the purpose of a community resource capacity assessment. (pp 111-112)
6. Describe the role of outreach services in patient care. (pp 111-112)
7. Explain how the community paramedic builds a web of resources. (pp 112-114)
8. Describe how the community paramedic uses the community health needs assessment, the health care delivery system gap analysis, and the community resource capacity assessment in providing patient care. (pp 114-116)

Readings and Preparation

- Review all instructional materials including ***Community Health Paramedicine***, Chapter 9, and all related presentation support materials.
- Review local protocols relating to outreach services in patient care.

Support Materials

- Lecture PowerPoint presentation

Enhancements

- Direct students to visit Navigate 2.
- Provide copies of local protocols.

Unit Activities

Writing assignments: Instruct each student to put together a scenario for a community needs assessment.

Student presentations: Divide students into groups. Instruct each group to act out the community needs assessment scenario (developed for the writing assignment) for the rest of the class.

Group activities: Discuss and critique each student presentation as a group. Discuss problems regarding a community health needs assessment, collecting statistics to populate a community map, building a web of resources, and outreach services in patient care.

Pre-Lecture

You are the Community Paramedic

"You are the Community Paramedic" is an opening case study that encourages critical thinking skills.

Instructor Directions

1. Direct students to read the "You are the Community Paramedic" scenario found a the beginning of Chapter 9.
2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question.
3. You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. Community needs assessments

1. The community's health care needs are identified by public health departments and community paramedicine programs.
2. This chapter discusses:
   a. Two types of community health assessments
   b. Role of the community paramedic in each type of community needs assessment
   c. How community paramedics use community needs assessments
   d. How the community paramedic assembles a list of community services that can address the needs of the patient

II. Community Health Needs Assessment

A. A community health needs assessment (CHNA) is a formal assessment of the health demographics and health status of the residents in a community.

1. Most often performed by a local public health department, with a steering committee comprised of numerous health care, social service, and community-based stakeholders
2. While each community decides how the CHNA will be developed, a common approach is outlined in this section.
3. The primary purpose of the CHNA is to prioritize measures that the community will undertake to improve the overall health of the community.
4. The first step in developing the CHNA is the assembly of the steering committee.
5. Typical stakeholders involved in the CHNA development process include:
   a. Hospitals
   b. Physicians
   c. The local public health department
   d. Medical and community clinics
   e. School districts
   f. Social assistance agencies (such as the United Way or the Area Agency on Aging)
   g. Local universities
   h. Elected and appointed officials
   i. Emergency medical services (EMS) agencies
   j. Home health and hospice agencies

B. Create a community map

1. The second step in developing a CHNA is the creation of a community map by an assessor.
    a. An assessor is experienced at collecting and analyzing data.
2. A community map is an interactive tool that visually displays health care data in various overlays (layers of graphical data that highlight the locations of desired data).
3. Overlays of the community map may include data such as:
    a. Age, race, and income of populations within a region
    b. Prevalence of health conditions such as obesity, heart disease, diabetes, and asthma
    c. Life expectancy
    d. Health care utilization data such as frequency of 9-1-1 use, emergency department visits, and inpatient admissions
4. Community maps are used as part of the CHNA to provide health and health care insights to:
    a. Policy makers
    b. Journalists
    c. Consumer groups
    d. Academic researchers
5. It can also be used as a stand-alone graphical depiction of the community's health.
6. A community map may help to identify geographic regions with:
    a. High health risks
    b. High health care utilization
    c. Other factors that can be addressed by a community paramedicine program
7. Populating a community map
    a. The data necessary to compile a community map can be found in many national, regional, and local resources.
    b. The most robust source is the US Census Bureau, which collects:
        i. Population, economic, and income statistics
        ii. Data on several topics relating to health and health care, including:
            a) *Health insurance*. The number and percentage of people in the community who have health insurance
            b) *Disability*. The number and percentage of people in the community who have a disability
            c) *Health care industries*. The number of health care–related businesses in the community
            d) *Social assistance industries*. The number of agencies that provide community outreach services such as the United Way or Meals on Wheels

c. Many state public health departments publish health and related data that can be useful at the county or city level to populate a community map.
d. A county's public health department is also an invaluable source of health and health care statistical information.
e. Most of these data resources can be accessed and downloaded into various statistical analytic tools that can be used by an assessor to populate a community map.

8. Population
   a. The US Census Bureau is an excellent resource to determine the population of a service area.
   b. The assessor may also consult the state or local county's Department of Health and Human Services (DHHS) offices.
   c. The assessor will also acquire information on specific demographics of the community, including race, ethnicity, age, income, employment, and education.
9. Health statistics
   a. After collecting the population data for the community, the assessor digs deeper to help identify the specific health needs of the community.
   b. The Centers for Disease Control and Prevention (CDC) provides close-to-current data and statistics on topics ranging from alcohol use to life expectancy.
   c. Data and statistics on critical health topics can be extracted at the national, state, and local county levels.
   d. A comparison between all three levels can help identify local needs that may not be recognized on a federal level.
   e. The assessor will gather data and statistics on the following:
      i. Alcohol use
      ii. Asthma
      iii. Cancer
      iv. Chronic disease
      v. Deaths and mortality
      vi. Diabetes
      vii. Cardiovascular disease
      viii. Immunizations
      ix. Life expectancy
   f. This information could be used as a data tool to secure funding to support existing or new public health efforts.
   g. A data tool is the organization and presentation of compelling information on the need(s) in a community for local stakeholders.

10. University resources
    a. Local and state universities are excellent resources for existing data bases in public health.
        i. Example: University of Wisconsin's Population Health Institute has a public access website (www.countyhealthrankings.org) that provides detailed overviews on the health and wellness of individual states and counties.
11. Mental health data and statistics
    a. Government-based agencies, such as the DHHS, are the best source of information for mental health data and statistics.
    b. Alcohol and drug dependence rates will be included in this set of data.
    c. Example: A community's incidence of suicide maybe higher than that of the state. Data revealing that the community also has a higher dependence on alcohol would serve as evidence to support a program channeling education/funding to combat substance abuse in an effort to prevent suicide.

C. Verify the data

1. The next step in creating a CHNA is to verify the validity of the data by comparing the findings to existing community needs assessments in the area.
2. Most counties and/or cities will compile an annual report that includes the changes in their populations based on US Census reporting and local DHHS findings.
    a. It is important for the assessor to compare these data to his or her findings because some data may be more current than others.
3. The reason current data are essential is illustrated in the following example:
    a. The last CHNA in a county identified a significant incidence of emergency department visits for pediatric asthma cases, especially from three specific zip codes in the service area.
    b. As a result, the local public health department created a storefront pediatric clinic to increase access to pediatric primary care, which resulted in a significant decrease in emergency department visits.
    c. Relying on data from the previous CHNA and identifying a need that is already being addressed would have diverted scarce resources from new needs that may have developed in the community.

D. Organize the data

1. The next step is to organize the collected data.
2. This organized information will reflect the strengths and weaknesses in the local area.
3. The assessor may use a:
    a. Spreadsheet
    b. Chart
    c. Bulleted list

4. Data will be organized by category, including:
    a. Gender
    b. Race
    c. Diseases
    d. Mortality
    e. National, state and local
5. Once the data are organized, graphs and charts are generated as simple visual tools to reinforce the findings.
    a. Graphs and charts are useful when submitting findings to influence community leaders because a visual representation of statistical information is often easier to comprehend than raw data.
6. Statistical maps
    a. A statistical map is a visual depiction of statistics.
    b. Often reveals correlations between factors that:
        i. Lead to health disparities
        ii. Help identify community health needs
    c. Statistical maps break down population demographics based on socioeconomic factors and health factors such as:
        i. Median income by location
        ii. Gender and race by location
        iii. Employment by location
        iv. Cardiovascular disease
        v. Stroke
        vi. Diabetes
        vii. Cancer
        viii. Mortality rates
    d. When selecting the data to include in a statistical map, the assessor needs to determine the categories in which the local area is higher or lower as compared to the national average.
    e. Mapping the area with statistics
        i. Statistical maps of the community can strategically identify geographic hot spots for chronic disease and public health issues.
        ii. A target area is the focused geographic and health-specific profile being addressed.
        iii. To better prepare a strategy to combat a specific problem, public health officials would reference a demographic profile map (visual depiction of data such as age and gender) and socioeconomic profile map (visual depiction of data such as income, employment, and health status) created from the data.
        iv. A statistical map will also help community paramedics understand the local issues that may influence an individual patient's health.

III. Health Care Delivery System Gap Analysis

A. A health care delivery system gap analysis identifies the potential gaps in the local health care system.

1. The health care delivery gap analysis is best achieved in a group format, with all stakeholders represented.
2. Participants in the health care delivery system gap analysis may include:
   a. Hospital representatives
   b. State and regional EMS officials
   c. Public health departments
   d. Home health agencies
   e. Hospice agencies
   f. Community-based organizations (eg, United Way, Meals on Wheels, area agency on aging, faith-based charities, Salvation Army)
   g. Clinics
   h. Educational institutions
   i. Mental health agencies
   j. Public officials
3. It may also include a brief overview of the community paramedicine concept to help guide the discussion to identify any gaps the participants believe to exist in the current local delivery system.
4. Typically, this meeting will occur as the community paramedicine program is being developed.
   a. Thereafter, it may occur periodically to reassess the needs of the community and to assess how the community paramedicine program is impacting the community.

IV. Community Resource Capacity Assessment

A. Assessing all community resources

1. The community resource capacity assessment is an assessment of all the resources available in the community that may assist the community paramedic in the management of a patient.
   a. Case managers and social workers develop their own list of resources, but rarely is there a complete compendium of these resources available to everyone involved in a patient's care.
   b. These resources are not always updated on a regular basis, leading to frustration or confusion.
2. The community paramedicine program should help facilitate an effort to bring the principal people leading the various community resources together on a regular basis so that these leaders may communicate any changes in their contact information or in the services they provide.

a. May be referred to as a Care Coordination Council or Community Resource Panel
b. As these meetings occur, participants should be encouraged to bring new resources or agencies to the meeting for introduction and to provide information on their services to the group.

B. Outreach services

1. An outreach service is a program designed to deliver health care or social services as directly to the patient as possible.
   a. Many patients will not go to the community resource; therefore, the resource needs to come to them.
   b. Some may argue that a community paramedicine program meets the definition of an outreach service.
   c. Example of an outreach service: the Mobile Crisis Outreach Team (MCOT) in Texas
2. As a community paramedic, you will use the CHNA and the community resource capacity assessment to help compile a list of outreach services available in your community.

C. Web of resources

1. Typically a web of resources is a collection of the outreach services available, cataloged and referenced by:
   a. Type
   b. Geography
   c. Eligibility
   d. Hours of operation
2. This collection can be an online guide, or an online map, such as the one created by the 504HealthNet project in New Orleans.
3. The community paramedic can use a web of resources in navigating patients to the outreach services necessary to improve the patient's health status.
   a. Example: If the patient lacks health insurance and is ineligible for Medicaid, knowing that a Federally Qualified Health Center (FQHC) is available/accessible in the community allows the community paramedic to make the proper referral.
4. Focus: outreach service mapping
   a. The process of mapping outreach services in the community should be collaborative.
   b. A logical process for building the resource inventory that can be put into a web of resources is to regularly host a collaborative meeting of all health care partners.
   c. The first step in mapping outreach services is to list the hospital(s) in the area.
      i. Hospitals may have outreach programs already in place (eg, CPR courses for new parents)

   ii. Hospitals may be directly affiliated or support free or subsidized medical, dental, and eye clinics in the area.
   iii. Urgent care center may also offer care on a sliding scale based on income and insurance plans.
  d. Along with the clinics that help support patients based on income, a complete list of medical care providers in the community should be assembled.
  e. Organize the medical care providers by specialty, including:
   i. Primary care
   ii. Obstetrics and gynecology (OB/GYN)
   iii. Cardiology
   iv. Pulmonology
   v. Endocrinology
   vi. Geriatric
  f. Some medical care providers may offer subsidized care or provide community outreach education programs.
   i. As a community paramedic, your role is to be a navigator to services, not the direct provider of services already available in the community.
   ii. Before providing a patient with further information on a medical care provider, verify with the medical director or the patient's primary care physician that you may proceed with the referral.
5. Employment services
  a. Employment services should be included in the web of resources.
   i. Private employment staffing agencies
   ii. Public or nonprofit agencies
  b. Along with contact information for each resource, the web of resources should list what types of requirements are needed.
   i. A background check
   ii. Completion of a physical
   iii. An established place of residence
6. Housing
  a. Available housing and shelter resources are rarely advertised in plain view of the general public, so it is realistic that someone who is homeless does not know how to access these resources.
  b. There are many different levels of eligibility for these resources, and an extensive list with the entrance and occupancy requirements is key to proper use of what is available (eg, some shelters require employment).
  c. Shelter and housing resources can be broken down by the situation that caused the need for housing or shelter.
   i. Domestic violence shelters
   ii. Long-term subsidized housing through government or foundation funding
   iii. Short-term and long-term housing of veterans

iv. Mental crisis housing
v. Halfway housing where eligibility is based on the penal system
vi. Crisis housing supported by humanitarian organizations (eg, American Red Cross, United Way, and Salvation Army)

7. Mental health and substance abuse
   a. Mental health and substance abuse services can include any combination of short-term, long-term, and crisis care.
   b. There may be a variety of agencies available that could provide both outpatient and inpatient care.
   c. Outreach services in this category should be organized according to the types of mental health services provided by each agency.
   d. Some of these agencies are subsidized by government funding and may require focused eligibility requirements prior to patient enrollment.
      i. Example: US Department of Veterans Affairs (VA)
8. Extended and transitional care facilities
   a. Extended and transitional care facilities are a valuable resource.
   b. Extended care facilities are facilities such as skilled nursing and assisted living facilities.
   c. They are generally used for long-term placement of patients unable to care for themselves independently.
   d. Points of contact: social workers and case managers
9. Community outreach through religious organizations
   a. Religious organizations often help to provide food and clothing to the community.
   b. Note that eligibility for services through some religious organizations may vary based on their overall mission and the focus of the program enrollees.
   c. The mental health needs of a patient may be complemented through the social support of a religious network.
      i. In the case of mental health referrals, coordinate these referrals with the medical director or the patient's primary care physician, depending on local protocols.
   d. Volunteers may be able to perform tasks such as housing repairs, assisting with special housing needs such as building ramps, and home visits.
10. Department of Health and Human Services
    a. The federal and state offices of the DHHS provide significant outreach services.
    b. Local offices should be contacted to learn the services available in the community.
    c. Examples of services offered by the Texas Health and Human Services Commission include:
       i. Education on nutrition

ii. Administration of guardianship programs for patients who are unable to manage their daily needs due to disease or injury
iii. Support for people with special needs
iv. Information on the health and human services available in each community

d. Contacts within the DHHS may include, but are not limited to:
i. Senior population case workers help the patient navigate the various services available.
ii. Pediatric population case workers help the patient navigate the various services available.
iii. Grant officers help patients obtain funding for necessary health care or social needs.
iv. Public health officers may identify additional health care resources available for patients being cared for in the community paramedicine program.
v. Inventory officers may provide goods such as food, clothing, medical supplies, or even furniture.
vi. Case managers may help obtain insurance coverage for patients through Medicare and Medicaid.
vii. Indigent medical disability case workers may assist with navigation of patients to services available to indigent patients.

11. Special needs
a. Special needs services can encompass a variety of needs.
b. Determining the nonmedical needs of a patient enrolled in a community paramedicine program should be part of the overall patient intake process.
i. Checklists can be exceptionally valuable to help determine these needs.
c. A great way to begin this process is to first consult the local DHHS office for a list of organizations.
d. A few examples of outreach services for patients with special needs include the following:
i. Easter Seals provides teams of therapists, teachers, and other health professionals to help people overcome challenges.
ii. The American Red Cross provides disaster relief to people impacted by everything from a house fire to a natural disaster.
iii. The American Cancer Society provides support, education, and resources for patients and families of people with cancer.
iv. Early childhood intervention services are organizations that provide developmental therapies to children at risk of or displaying developmental or social delays.
v. The National Autism Association, the Autism Society of America, and Autism Speaks are organizations that provide support to parents and caregivers of children and adults on the autism spectrum disorder.

vi. Therapeutic animal services are organizations that provide therapy with horses, cats, and dogs for patients with vision, hearing, mobility, and behavioral challenges.

12. Transportation
    a. Transportation services should be organized by the specific services provided, such as bus vouchers or handicapped-accessible services.
    b. Access to services is key, because some patients will not have their own transportation or the funds to obtain it.
    c. Some hospitals may offer limited transportation services to and from medical appointments.
13. Safety net programs
    a. Safety net programs are programs that seek to prevent those in poverty or those vulnerable to poverty from falling below a certain poverty level.
    b. Safety net programs may be provided by the public sector, such as:
        i. Federal
        ii. State
        iii. Local government

    Or by the private sector, such as:
        i. Nongovernmental organizations
        ii. Private firms
        iii. Charities
        iv. Informal household transfers
    c. Safety net programs include the following:
        i. Cash transfers. Local charitable organizations may be able to provide cash assistance for patients to help with utility bills, rent, or even prescription medications.
        ii. Food-based programs. Communities often have supplementary feeding programs and programs to distribute food stamps, vouchers, and coupons.
        iii. In-kind transfers. Local charitable organizations may provide school supplies and uniforms.
        iv. Price subsidies. Some programs provide assistance for purchasing food, electricity, or public transport.
        v. Public works departments. Utilities may have special programs to help make utility bills more affordable to those in need.
        vi. Fee waivers and exemptions. Programs may be available to assist in health care, schooling, and utilities costs.

V. Applying Community Needs Assessments in Patient Care

A. Application example

1. Let's apply the information the community paramedic can gain from studying the CHNA, health care delivery system gap analysis, and community resource capacity assessment for an individual patient.
    a. Example: Mr. Corbett is 55-year-old man who makes frequent trips to the emergency department for depression. He has been referred to your program to see if he can find better resources for his needs. He has congestive heart failure and you learn that he consumes more than the average daily intake of alcohol.
    b. Typical referrals that may help Mr. Corbett include both medical and mental health components.
        i. Educate him on his condition
        ii. Ensure medication compliance
        iii. Strengthen access to and use of primary care
    c. Using the access points contained in your web of resources for agencies that help patients with depression and/or anxiety conditions could help prevent the need for actual substance abuse treatment in the future.

B. Patient referral process

1. The patient referral process is key to linking patients with the proper outreach services to meet their needs.
2. To truly serve the patient, it is important that phone calls be made to help actually refer the patient directly.
    a. Depending on local protocols, these calls may be made by the community paramedic, a case manager, or a social worker on the patient's health care team.
    b. Since one of the goals of enrollment in a community paramedicine program is to empower patients to self-manage their needs, the community paramedic should teach the patient how to access these resources by having the patient participate in the phone call.
3. It is the duty of the community paramedic and the patient's health care team to ensure that the patient is not simply told about a resource, but is truly referred to a resource.
4. Anytime a patient receives care from multiple providers, there is a risk that no one will see the patient as a whole.
    a. As the community paramedic, you need to help fill this gap by being the navigator of services to the patient and the eyes and ears of the medical director.

Post-Lecture

Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (**date to be determined by instructor**).

B. Read Chapter 10, “Patient Needs Assessment,” for the next class session.

Chapter 10
Patient Needs Assessment

Unit Summary

After students complete this chapter and the related course work, they will be able to describe the purpose of the patient needs assessment, explain why patient input is important to include in a patient needs assessment, identify special considerations that can affect the needs of the patient, and discuss the discovery learning method.

Objectives

1. Describe the purpose of the patient needs assessment. (p 119)
2. Explain why patient input is important to include in a patient needs assessment. (pp 120, 122)
3. Identify the special considerations that can affect the needs of the patient. (pp 123-125)
4. Describe the discovery learning method. (pp 125-126)

Readings and Preparation

- Review all instructional materials including ***Community Health Paramedicine***, Chapter 10, and all related presentation support materials.
- Review local protocols relating to the purpose of a patient needs assessment, patient input in a patient needs assessment, considerations that can affect the needs of a patient.

Support Materials

- Lecture PowerPoint presentation

Enhancements

- Direct students to visit Navigate 2.
- Provide copies of local protocols.

Unit Activities

Writing assignments: Instruct each student to put together a scenario for a patient needs assessment.

Student presentations: Divide students into groups. Instruct each group to act out the patient needs assessment scenario (developed for the writing assignment) for the rest of the class.

Group activities: Discuss and critique each student presentation as a group. Discuss problems regarding performing the patient needs assessment, patient input on a patient needs assessment, and considerations that can affect the needs of a patient.

Pre-Lecture

You are the Community Paramedic

"You are the Community Paramedic" is an opening case study that encourages critical thinking skills.

Instructor Directions

1. Direct students to read the "You are the Community Paramedic" scenario found a the beginning of Chapter 10.
2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question.
3. You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. Patient needs assessment

1. A tool that enables the community paramedic to gather information about the patient that extends beyond the working diagnosis, taking into consideration factors such as the patient's:
   a. Health history
   b. Living environment
   c. Social network
2. A thorough patient needs assessment provides the patient information that the community paramedic requires to help determine all of the patient's needs, from transportation to health care to social services.
3. Important roles of the community paramedic are:
   a. Performing an accurate patient needs assessment

b. Offering education and referrals based on that patient needs assessment
c. Navigating the patient toward self-management

II. Patient Needs Assessment

A. A systematic approach

1. The patient needs assessment is a systematic approach to ensuring that the patient receives the most applicable health and outreach services.
2. It improves patient outcomes by helping to identify the resources and tools that will assist the patient to apply self-management strategies.

B. Purpose

1. The patient needs assessment considers all aspects of a patient's needs, from physical to psychological to social to financial.
   a. Reviews the social determinants impacting the patient's health (living environment to family structure)
   b. Enables the community paramedic to fully engage in the patient's care and assist the patient in developing a resource network or a personal web of resources
2. The patient needs assessment accomplishes the following:
   a. Collects data and identifies the patient's needs
   b. Identifies the resources the patient needs to better manage his or her health
   c. Provides an opportunity for the patient to consider all of his or her needs, from social to health care to transportation
   d. Provides the patient with the opportunity to build a resource network, with the community paramedic acting as a navigator

C. Performing a patient needs assessment

1. The patient needs assessment consists of the following components:
   a. Research
   b. Interview
   c. Evaluations
2. The patient needs assessment:
   a. Starts before the first (or enrollment) visit
   b. Continues during the intake visit
   c. Continues throughout the patient–community paramedic relationship
3. Research
   a. Begins before the first visit or enrollment visit with the patient
   b. Research is performed to gather information on the patient's medical condition and demographics.
   c. Community paramedic should review the patient's:

i. Electronic medical records
ii. Plan of care
iii. Discharge plan

d. Day of intake visit, review the patient's:
i. Medical history
ii. Demographic information
iii. Age, address, and occupation

4. Interview
a. A fact-finding mission to verify and gather key demographic information
b. In general, a patient needs assessment should consider the following:
i. The patient's ability to perform self-care and monitor his or her health status at home (eg, blood glucose levels)
ii. Care capacity within the home, including whether there is a willing, available, and competent family caregiver, if needed
iii. The cognitive and functional needs of the patient and caregiver
iv. The patient's ability to understand and explain (teach back) information on his or her medical condition or self-care requirements
v. The learning style in which the patient and caregiver best learn information (visual aids, written instructions, and verbal explanations)
vi. Current access to social and financial resources
vii. Current access to outreach services such as grocery or pharmacy delivery, meal delivery services, transportation, or support groups
viii. The cultural values of the patient, caregiver, and family
c. To perform a successful patient needs assessment, it is vital to:
i. Engage the patient in an empathic, welcoming manner
ii. Build a rapport that facilitates the open disclosure of information regarding physical, psychological, and social issues
iii. Create a safe and nonjudgmental environment in which sensitive personal issues may be discussed
d. The patient needs assessment involves:
i. Determining what the patient wants and how the patient perceives his or her current needs
ii. Determining what the patient would like to change
iii. Asking the patient how he or she thinks change will best occur
e. During the patient needs assessment, the following questions may be helpful in identifying key members of the patient's social circle:
i. Who lives with you?
ii. Who makes your appointments?
iii. Who takes care of your medication?
iv. Who prepares your meals?

v. Who does the housework and grocery shopping?
vi. Who else is involved in your care?
vii. When is the best time for your caregiver to be here to learn with you?
viii. Which outreach services do you want to work with to help you self-manage your health?

f. Questions to ask yourself during the patient needs assessment include the following:
i. What is the patient's problem?
ii. What is the extent and severity of the patient's problem?
iii. What outreach services is the patient using currently?
iv. What does the patient want?
v. What are the patient's goals?
vi. What does the patient need to meet personal goals?
vii. What outcomes will be used to evaluate change?
viii. What criteria will be used to evaluate success?

g. Family support
i. During the patient needs assessment, it is important to spend time focusing on the family as a whole.
ii. The first step is to define who makes up the patient's family.
iii. Determine if family members live with patient, if any of the family members provide support or resources to the patient, and if the patient is supporting family members.

5. Evaluation
a. Part of the patient needs assessment may include the evaluation of the patient's home environment.
i. Home accidents/falls
b. Evaluating the home environment identifies potential issues that could prevent the patient and the patient's family from living in and maintaining a healthy home environment.
c. In general, a home safety assessment will include walking through the home and looking for specific indicators of a healthy environment:
i. The air quality inside the home
ii. The overall condition of the structure
iii. The overall cleanliness of the home
iv. The presence of working smoke detectors
v. The condition of walkways, stairways, and floors
d. As a community paramedic, you will need to identify any risk factors in the environment that may affect the patient's health and well-being.
i. Identify potential hazards
ii. Discuss with patient how to eliminate the hazards

iii. Determine if home modifications are required; prioritize which items need to be addressed first

e. Work
   i. The physical environment in which a patient works can increase the likelihood that certain illness will occur
   ii. Some kinds of cancer are more likely to develop in industrial workers who are exposed to certain chemicals.
   iii. The community paramedic may assess the need to refer the patient to preventive health screenings based on workplace risk factors or refer the patient to employee assistance programs.

f. Transportation
   i. Poor transportation reduces education, employment, and health care outcomes.
   ii. A transportation evaluation should be performed for each patient.

D. Goals

1. At the start of the patient–community paramedic relationship, the community paramedic may identify many goals that he or she would like to see the patient accomplish.
   a. Do not identify too many goals; patient has a fixed amount of time and energy.
   b. Ideally, goals will come from the patient, the person who will be making the change.
2. As a community paramedic, prioritize your goals for the patient and the patient's goals.
   a. Focus on the top three goals to begin and ensure that at least one of the patient's goals is in that list.
   b. Once these goals are accomplished, move on to the next set of three.

E. Documentation

1. After the first patient visit, write a brief description of the visit to create a concise summary of what occurred.
   a. Fill out all standard forms used in the community paramedicine program.
   b. The community paramedic should document:
      i. Anything unexpected that occurred
      ii. Initial observation of the patient (healthy, sick, or awake)
      iii. Initial observation of the patient's family
      iv. Any issues identified by the patient or the patient's family
      v. Your observations about the patient's home environment

III. Determining the Individual Needs of the Patient

A. Outreach services

1. Once the information is gathered, determine what supports need to be put in place for the patient to reach his or her goals and plan of care outcomes.
    a. Outreach services requested for immediate and continued prevention may include assistance with daily living skills.
    b. Outreach services include the following:
        i. Preventive and primary care services
        ii. School health services
        iii. Physicians
        iv. Clinics
        v. Parish nursing
        vi. Volunteer agencies
        vii. Diagnostic services
        viii. Hospitals
        ix. Rehabilitation services
        x. Extended care facilities
        xi. Respite care
        xii. Day care centers
    c. The community paramedic must be committed to being creative, identifying each outreach service appropriate for each patient, and identifying the sources of support.

IV. Special Considerations

A. Considerations that affect patients' needs

1. When performing a patient needs assessment, the community paramedic must be mindful of some special considerations, including:
    a. Housing status
    b. Special needs
    c. Age
    d. Medical literacy

B. Homelessness

1. When working with patients who are homeless, the components of the patient needs assessment are the same, but the approach differs.
    a. The focus will be more on addressing the immediate problems of the patient, such as securing shelter.
    b. When interacting with patients who are homeless:
        i. Ensure that your manner is accepting and nonjudgmental

ii. Listen to the patient's concerns and provide unconditional positive regard for the patient.
iii. Be direct with your communication and sensitive to the reality of the patient's current living conditions.

2. Referrals to shelters should occur early in the day.
   a. Often, shelters require that a person be present in the afternoon if he or she wishes to secure a bed for the night.
   b. Always follow local protocols.

C. Autism spectrum disorder

1. Autism spectrum disorder (ASD), more commonly called *autism* by the general public, is a neurobiologic spectrum disorder that encompasses a range of complex neurodevelopmental disorders.
2. There are many hallmark signs and characteristics of ASD, yet each person with ASD is unique.
   a. Abilities of people with ASD fall across a long continuum.
   b. Each person with ASD has his or her own special behaviors.
   c. Severity of symptoms is also unique.
   d. If the patient with ASD has a caregiver, ask the caregiver for guidance on the best way to approach the patient.
   e. Follow local protocols.
3. As a community paramedic, you may assist patients with ASD by connecting them with the outreach services that can assist in the goal of self-management.
   a. Follow local protocols.

D. Physical disabilities

1. Physical ability in patients can be reduced by:
   a. Age
   b. Injury
   c. Illness
2. As a community paramedic, you can assist patients with a temporary or permanent disability by:
   a. Navigating the patient to outreach services that will assist in self-management
   b. Educating the patient on what is possible with modifications or assistance
      i. Assist the patient in creating alternatives/solutions to respond positively to challenges and improve the patient's quality of life

E. Dementia

1. As a community paramedic, you may assist patients with dementia by navigating the patient to the outreach services that can help the patient and caregiver in maintaining the patient's optimal functioning.
   a. Outreach services can also provide encouragement and emotional support for the patient's caregiver.

b. Respite care programs can:
    i. Provide patients with high-quality day or temporary care in a safe environment
    ii. Give caregivers a break from the daily task of caring for patients

F. Age

1. Precautions and adjustments to the home environment can help to ensure safety and reduce the risk of injuries.
2. The patient assessment:
    a. Will inform the community paramedic on the physical needs of the patient
    b. Is a component of the patient needs assessment
3. When performing a patient needs assessment for an older patient, remember the following:
    a. Each person ages differently, so do not make assumptions.
    b. Plan longer visits, or multiple short visits throughout the week.
    c. Speak clearly and directly, and do not shout. Sit where the patient can see your face and mouth. Depending on the patient, consider speaking slowly.
    d. Advise the patient when you are going to change the topic in the conversation.
    e. Older adults may worry about losing their independence. Let your patients know that your goal is to help them remain as independent as possible.

G. Medical literacy

1. As a community paramedic, you should keep in mind who your audience is.
    a. Use a vocabulary the patient understands.
    b. Avoid medical jargon.
2. As you perform the patient needs assessment, determine the level of the patient's medical literacy.
    a. Example: a patient with a background in pharmacology will have a larger medical vocabulary than a patient with a background in engineering.
3. Keep in mind the patient's reading level and ability.
    a. As a community paramedic, it is your job to determine the best format to present information for each patient.
    b. If a patient has challenges reading, then verbally present the information in the written educational resources. Give your patients the tools to succeed.

H. Abuse and neglect

1. In the event of abuse or neglect, through collaboration with the appropriate local resources, the patient needs assessment should offer:
    a. Early detection
    b. Prompt intervention
2. Abuse can take many forms:
    a. Physical

   b. Sexual
   c. Emotional
   d. A combination
3. While completing the patient needs assessment, you must be cognizant of:
   a. Unusual interactions with family members or caregivers
   b. Unusual patient behavior
   c. Unexplained injuries
4. Be alert to the signs and symptoms of abuse, including:
   a. Unusual bruising
   b. Nonspecific complaints
   c. History of depression
   c. Attempted suicide
5. Neglect may be reflected in:
   a. Inappropriate clothing
   b. Poor hygiene
   c. Untreated medical issues
   d. Disconnected utilities
   e. Neglected pets
   f. Spoiled food
6. Note that older patients are vulnerable to financial abuse, as their family or caregivers often have ready access (authorized or not) to their financial resources.
   a. Patient complaints of unusual activity in the patient's bank account is a warning sign.
7. Physical, sexual, and financial abuses are crimes in all states and must be reported to the authorities.
   a. Follow local protocols.

V. Discovery Learning Method

A. Problem solving

1. The discovery learning method is a useful technique for teaching patients problem-solving skills.
2. It is inquiry-based and encourages the patient to be an active agent in learning.
3. The patient draws from past experience and existing knowledge to discover:
   a. Facts
   b. Relationships
   c. New concepts
4. The patient is more likely to remember concepts and knowledge discovered independently.

5. During a discussion, the community paramedic may pose a pertinent problem or situation for the patient to solve.
6. The discovery learning method may also be applied by community paramedics during the patient needs assessment.
    a. Example: a patient reports feeling hungry but does not eat when food is served by the family member.
    b. The community paramedic should assess why the patient is not ingesting the food being provided by interviewing the patient.
    c. The community paramedic discovers that the food the family member is providing is too bland and can redirect the situation.
    d. Knowing the cause of the issue is the first step in finding a solution.

Post-Lecture

Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (**date to be determined by instructor**).

B. Read Chapter 11, “Pathophysiology,” for the next class session.

Chapter 11
Pathophysiology

Unit Summary

After students complete this chapter and the related course work, they will be able to define pathophysiology and describe how alterations in homeostasis can lead to disease, discuss the structures and functions of various types of cells, describe the processes of cell signaling and feedback, discuss the types of tissues in the body and how they react to cell injury, and describe the stages in the inflammatory response and the immune response.

Objectives

1. Define pathophysiology and homeostasis, and describe how alterations in homeostasis can lead to disease. (pp 129-131)
2. Explain the structure of a cell and the general functions performed by different types of cells. (pp 129, 131)
3. Describe the implications of disruptions to fluid balance, water movement, and electrolyte balance. (pp 129-137)
4. Explain how the body's buffering systems work to maintain acid−base balance and the consequences of acid−base imbalances. (pp 137-140)
5. Describe the processes of cell signaling and feedback, and explain how alterations in these processes cause disease. (pp 139-141)
6. List the types of tissues found in the body, and explain how they react to cell injury. (pp 141-145)
7. Describe the components of the immune system. (pp 145-148)
8. List the types of inflammatory responses. (pp 147-149)
9. Describe the immune response. (pp 149-153)

Readings and Preparation

- Review all instructional materials including ***Community Health Paramedicine***, Chapter 11, and all related presentation support materials.
- Review local protocols relating to types of tissue injury and inflammatory response.

Support Materials

- Lecture PowerPoint presentation

Enhancements

- Direct students to visit Navigate 2.
- Provide copies of local protocols.

Unit Activities

Writing assignments: Instruct each student to put together a scenario to show how normal physiologic processes are affected by disease.

Student presentations: Divide students into groups. Instruct each group to act out how normal physiologic processes are affected by disease (developed for the writing assignment) for the rest of the class.

Group activities: Discuss and critique each student presentation as a group. Discuss problems regarding homeostasis and the systems in place to maintain it, the implications of disruptions to fluid balance, water movement, and electrolyte balance, the components of the immune system and how that system works.

Pre-Lecture

You are the Community Paramedic

"You are the Community Paramedic" is an opening case study that encourages critical thinking skills.

Instructor Directions

1. Direct students to read the "You are the Community Paramedic" scenario found a the beginning of Chapter 11.
2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question.
3. You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. Pathophysiology

1. The study of how normal physiologic processes can be altered by disease or the body's response to injury
   a. Pathophysiology delineates the mechanisms of disease processes.
2. Understanding disease processes is important for community paramedics in order to:
   a. Anticipate situations better
   b. Correct problems
   c. Provide the most appropriate care to their patients
3. Homeostasis
   a. Originally described by the American physiologist Walter B. Cannon in 1932
   b. A term derived from the Greek words for "same" and "steady"
4. All organisms constantly adjust their physiologic processes in an effort to maintain an internal balance.
5. All body components constantly communicate with one another to maintain the critical balance required for health.
   a. For every cell, tissue, or organ system that performs one function, there is always at least one that performs an opposing function.

II. Cells and Their Environment

A. Cells

1. Cells can be classified into two general groups:
   a. Nonspecialized
   b. Specialized
2. Specialized cells function with similar cells to perform complex tasks within the body.
   a. Immature cells (stem cells) are able to differentiate into a variety of cell types.
   b. Mature cells are fully differentiated cells.
3. Nearly all cells, except red blood cells and platelets, have three main components:
   a. Nucleus
   b. Cytoplasm
   c. Cell membrane
4. The nucleus contains the genetic material, called chromatin, and the nucleoli, which are rounded, dense structures that contain ribonucleic acid (RNA).

   a. RNA is the substance in cells responsible for controlling cellular activities.
5. The cytoplasm comprises a combination of fluid and organelles. The major organelles include:
   a. Ribosomes (contain RNA and protein)
   b. Endoplasmic reticulum (manufacture lipids)
   c. Golgi complex (form carbohydrate and complex protein molecules)
   d. Lysosomes (function as an intracellular digestive system)
   e. Mitochondria (produce adenosine triphosphate [ATP])
6. Each cell is surrounded by a cell membrane made up of molecules that are able to alter its structure dependent on the needs of the cell at any one time.

III. Water and Electrolytes

A. Fluid balance and water movement

1. The average adult takes in approximately 2,500 mL of water a day.
2. Most water (60%) is lost in the form of urine; 28% is lost through the skin and lungs; 6% is lost in the feces; and 6% is lost through sweat.
3. Water and dissolved particles (solutes) move between cells as well as between blood vessels and connective tissues.
4. The two general methods of movement are:
   a. Passive transport
   b. Active transport
5. Passive transport includes the following processes:
   a. Diffusion
      i. Movement of a substance from an area of higher concentration to an area of lower concentration
   b. Facilitated diffusion
      i. Use of a transport molecule within the membrane to move a substance
   c. Osmosis
      i. Movement of a solvent from an area of low solute concentration to one of high concentration through a selectively permeable membrane
   d. Filtration
      i. Movement of water and a dissolved substance from an area of high pressure to an area of low pressure
6. Active transport involves movement via “pumps” or transport molecules that require energy to operate.
   a. These pumps move substances from an area of low concentration to an area of high concentration.
7. Water moves between intracellular and extracellular fluid compartments by osmosis.

a. Osmosis: the movement of water down its concentration gradient across a membrane
b. Osmotic pressure is the pressure that develops when two solutions of different concentrations are separated by a semipermeable membrane.
c. Water moves from regions of low osmotic pressure to those of higher osmotic pressure.

8. The intracellular fluid volume is controlled by the large numbers of proteins and organic compounds that cannot escape through the cell membrane and by the sodium–potassium (Na +/K +) membrane pump.
   a. To maintain homeostasis, the Na +/K + pump must be functional; it is essential to the cell's electrical potential.
9. Plasma makes up approximately 55% of the blood. It is composed of 91% water and 9% plasma proteins.
   a. Plasma proteins include:
      i. Albumin (maintains osmotic pressure)
      ii. Globulin
      iii. Fibrinogen
      iv. Prothrombin (assists with clotting)
10. Under normal conditions, the amount of fluid filtering outward through the arterial ends of the capillaries equals the amount of fluid that is returned to the circulation by reabsorption at the venous ends of the capillaries.
11. The equilibrium between the capillary and interstitial space is controlled by four forces:
    a. Capillary hydrostatic pressure
    b. Capillary colloidal osmotic pressure
    c. Tissue hydrostatic pressure
    d. Tissue colloidal osmotic pressure
12. Capillary and membrane permeability plays an important role in the movement of fluid and the creation of edema in the surrounding tissues.
13. If permeability increases, capillaries and membranes are more likely to leak.

B. Alterations in water movement: edema

1. Edema is the accumulation of excess fluid in the interstitial space.
   a. Peripheral edema, such as in the ankles and feet, is the most common form.
2. Edema may stem from a number of conditions, including:
   a. Increased capillary pressure
   b. Decreased colloidal osmotic pressure in the capillaries
   c. Lymphatic vessel obstruction

C. Fluid and electrolyte balance

1. Water balance in the body is maintained through a combination of factors. Normally, the thirst mechanism and release of antidiuretic hormone (ADH) are the most important components in this balance.
2. The renin–angiotensin–aldosterone system (RAAS) also plays a role in maintaining water homeostasis.
3. The body's state of hydration is monitored continuously by three types of receptors located in the brain, blood vessels, and kidneys:
   a. Osmoreceptors
   b. Volume-sensitive receptors
   c. Baroreceptors
4. The most potent stimulation for the release of ADH is an increase in blood osmolarity.
5. When osmolarity increases, the pituitary gland releases ADH, also known as vasopressin. ADH stimulates the kidneys to resorb water, decreasing osmolarity.

D. Alterations in electrolyte balance

1. Sodium
   a. The most common cation (positively charged ion) in the body
   b. Sodium plays an important role in the regulation of the body's acid-base balance.
2. Sodium intake occurs through the diet. Sodium regulation occurs in the kidneys.
   a. Sodium levels are regulated primarily by the RAAS (rennin-angiotensin-aldosterone system) and by natriuretic proteins.
   b. The RAAS is a complex feedback mechanism responsible for the kidney's activity managing sodium levels in the body.
   c. Activation of the RAAS leads to retention of sodium and water.
   d. To maintain balance when there is too much sodium and water, the body produces natriuretic proteins, which inhibit ADH and promote excretion of sodium and water by the kidneys.
   e. Collectively, the interaction of ADH, renin, angiotensin II, aldosterone, and the natriuretic proteins regulate sodium and fluid levels in the body.
3. Causes of either hypernatremia (high sodium level) or hyponatremia (low sodium level) may include:
   a. Excess sweating from hot environmental conditions or exercise
   b. Gastrointestinal losses through vomiting, diarrhea, inappropriate intravenous fluid administration, or diuretic therapy
4. Chloride
   a. An important anion (negatively charged ion) in the body
   b. When a compound containing chloride is placed in water, the compound will separate into its original ionic form.

5. Chloride assists in regulating the acid–base balance, especially the pH of the stomach, and is involved in the osmotic pressure of the extracellular fluid.
    a. It is often the case that where sodium goes, chloride follows.
6. Potassium
    a. The major intracellular cation
    b. Critical to many functions of the cell
7. Potassium is necessary for:
    a. Neuromuscular control
    b. Regulation of the three types of muscles (skeletal, smooth, and cardiac)
    c. Acid–base balance
    d. Intracellular enzyme reactions
    e. Maintenance of intracellular osmolarity
8. Hypokalemia is a decreased serum potassium level, and hyperkalemia is an elevated serum potassium level.
9. Calcium
    a. Majority of the body's calcium is found in the bone
    b. Provides strength and stability for the skeletal system
    c. The absorption of calcium into the body is dependent on vitamin D.
10. Hypocalcemia is a decreased serum calcium level.
    a. Causes of hypocalcemia include:
        i. Decreased intake or absorption (eg, malabsorption and vitamin D deficit)
        ii. Increased loss (eg, alcoholism and diuretic therapy)
        iii. Endocrine disease (eg, hypoparathyroidism and sepsis)
11. Hypercalcemia is an increased serum calcium level.
    a. Common causes include:
        i. Increased intake or absorption (eg, excess antacid ingestion)
        ii. Endocrine disorders (eg, primary hyperparathyroidism and adrenal insufficiency)
        iii. Neoplasms (eg, cancers)
        iv. Miscellaneous causes (eg, diuretic therapy and sarcoidosis)
12. Phosphate
    a. Primarily an intracellular anion
    b. Essential to many body functions
    c. Phosphate levels may be normal, low (hypophosphatemia), or elevated (hyperphosphatemia).
13. Magnesium
    a. The second most abundant intracellular cation in the body, after potassium
    b. Approximately 50% of the body's magnesium is stored in the bones, 49% is contained in the body cells, and the remaining 1% is in the extracellular fluid.

c. Serum levels may be normal, low (hypomagnesemia), or high (hypermagnesemia).

IV. Acid–Base Balance

A. pH

1. pH is a measurement of the hydrogen ion concentration.
   a. The normal pH range of blood is 7.35 to 7.45.
   b. A blood pH greater than 7.45 is called alkalosis, and a blood pH of less than 7.35 is called acidosis.

B. Buffer systems

1. Normal body functions depend on an acid–base balance that is regulated within the normal physiologic pH range.
2. To maintain this delicate balance, the body relies on buffer systems.
   a. Buffers are molecules that modulate changes in pH to keep it in the physiologic range.
3. Because acid production is the major challenge to the body's pH homeostasis, most physiologic buffers combine with H^+ (hydrogen ion) to manage fluctuations in acid–base levels.
4. Buffer systems include proteins, phosphate ions, and bicarbonate (produced from carbon dioxide during metabolism).

C. Acid–base imbalance

1. When the buffering capacity of the body is exceeded, acid–base imbalances occur.
2. If the pH is too low (acidosis), neurons become less excitable and central nervous system depression results. Patients become confused and disoriented.
   a. If central nervous system depression progresses, the respiratory centers cease to function, causing death.
3. If the pH is too high (alkalosis), neurons become hyperexcitable, firing action potentials at the slightest signal.

a. If alkalosis is severe, muscle twitches may turn into sustained contractions that paralyze the respiratory muscles.

4. Acid–base disturbances are classified into two general categories, metabolic and respiratory. Each type is then broken down into two subtypes, acidosis and alkalosis.
5. Metabolic acidosis is an accumulation of abnormal acids in the blood for any of several reasons (eg, sepsis, diabetic ketoacidosis, and salicylate poisoning).
6. Metabolic alkalosis is a less common condition in acute care, yet is very common in chronically ill patients. There is either a buildup of excess metabolic base (eg, chronic antacid ingestion) or a loss of normal acid (eg, through vomiting or nasogastric suctioning).

7. Respiratory acidosis occurs when carbon dioxide retention leads to increased P_{CO_2} levels. It also occurs in situations involving hypoventilation (eg, heroin overdose) or intrinsic lung diseases (eg, asthma or chronic obstructive pulmonary disease).
8. Excessive blowing off of carbon dioxide with a resulting decrease in the P_{CO_2} levels causes respiratory alkalosis.
    a. Although this condition is often called hyperventilation, many potentially serious diseases may be responsible (eg, pulmonary embolism, acute myocardial infarction, severe infection, and diabetic ketoacidosis) for increased ventilatory levels.

V. Cell Signaling and Feedback

A. Cell signaling

1. Most communication within the body takes place at the cellular level. Cells communicate electrochemically through a process called cell signaling.
    a. Cells send signals through the release of molecules (such as hormones) that bind to proteins called receptors located on the surface of the receiving cells.
    b. This signaling triggers chemical reactions in the receiving cells, which leads to a biologic action.
    c. When the action is completed, an opposing system steps in, "turning off" the action. This cessation is termed feedback inhibition or negative feedback.
2. Most cellular communication includes a component of negative feedback in which the product of a reaction sends information back to its own "assembly line," stopping its own production.

B. Ligands and receptors

1. A ligand is any molecule, whether produced by the body (endogenous) or given as a drug (exogenous) that binds any receptor, anywhere, leading to any reaction.
2. Besides drugs given to a person (such as naloxone for an opiate overdose), other common ligands include:
    a. Hormones
        i. Substances formed in very small amounts in one specialized organ or group of cells and transported to another organ or group of cells in the same organism
        ii. Hormones perform specific regulatory actions and reach their targets through different means.
    b. Neurotransmitters
        i. Proteins that affect signals between cells of the nervous system
    c. Electrolytes
        i. Play an important role in cell signaling as well as in generating the nervous system's action potential

ii. Examples of electrolytes commonly found in the body include sodium, potassium, calcium, and chloride.

C. Alterations in cell signaling

1. When normal cell signaling is interrupted, disease occurs.
2. The normal counterbalances within the body are rendered ineffective; the result is that various normal regulatory systems begin to operate autonomously, without control.
3. The system stops providing critical negative feedback, which is necessary to regulate function; instead, unopposed (and abnormal) positive feedback is given.
4. Many human diseases can be attributed to malfunctions in the cell signaling process.

VI. Tissues

A. Tissues are composed of groups of similar cells working together for a common function.

1. Organs consist of various tissue types working together for a common purpose.
   a. The heart contains muscle, nervous, and connective tissues.
2. Organ systems consist of several organs working together for a common purpose.
   a. Cardiovascular system consists of the heart and blood vessels.
3. Epithelium is a type of tissue that covers all of the external surfaces of the body. Epithelial tissue also lines hollow organs within the body, such as:
   a. The intestines
   b. Blood vessels
   c. Bronchial tubes
4. Connective tissue binds the other types of tissues together.
   a. Bone and cartilage are subtypes of connective tissues.
   b. Adipose tissue is a special type of connective tissue that contains large amounts of lipids.
5. Muscle tissue is located within the substance of the body and invariably enclosed by connective tissue.
6. The three types of muscle are:
   a. Skeletal muscle (striated voluntary)
   b. Cardiac muscle (striated involuntary)
   c. Smooth muscle (nonstriated involuntary)

VII. Cell and Tissue Adaptation

A. Cell adaptation

1. When cells are exposed to adverse conditions, they go through a process of adaptation to protect themselves from injury.
    a. Atrophy: a decrease in cell size, leading to a decrease in the size of the tissue and organ
    b. Hypertrophy: an increase in cell size, leading to an increase in tissue and organ size
    c. Hyperplasia: an increase in the number of cells, often due to hormonal stimulation (that often occurs in tumors)
    d. Dysplasia: an alteration in the size and shape of cells, such as occurs in a tumor
    e. Metaplasia: a cellular adaptation in which one cell changes to another type of cell

B. Cell injury and death

1. Cellular injury may result from various causes, such as:
    a. Hypoxia (the most common cause)
    b. Chemical injury
    c. Infectious injury
    d. Immunologic injury
    e. Mechanical injury
    f. Inflammatory injury
2. The manifestations of cell injury and death depend on how many and which types of cells are injured.
3. Manifestations of cellular injury occur at the microscopic (structural) and functional levels.
4. Damage to and functional changes in individual cells often have an impact on the entire organism.
5. Cell injury may be reversible with proper treatment. Irreversible injury occurs once cells have passed the "point of no return," after which no treatment will help (cell death).

C. Injury resolution and repair

1. Normal wound healing involves four steps:
    a. Repair of damaged tissue
    b. Removal of inflammatory debris
    c. Restoration of tissues to a normal state
    d. Regeneration of cells
2. The healing process that occurs after tissue injury or loss caused by inflammation depends on the types of cells that make up the affected organ:

   a. Labile cells divide continuously. Organs derived from these cells (eg, skin or intestinal mucosa) heal completely.
   b. Stable cells (found in the liver and kidney) are replaced by regeneration from remaining cells, which are stimulated to enter mitosis.
   c. Permanent cells such as nerve cells and cardiac myocytes cannot be replaced. Scar tissue is laid down instead.
3. Healing by primary intention—healing that closes a wound caused by trauma—occurs in clean wounds with apposed margins (eg, a clean surgical wound).
4. Healing progresses in several stages:
   a. Blood fills the defect and coagulates, forming a scab—a meshlike structure composed of fibrin and fibronectin. If the inflammatory process is severe, tissue may be destroyed and require repair.
   b. Macrophages remove cellular debris and secrete growth factors. These growth factors stimulate angiogenesis and ingrowth of fibroblasts, leading to the formation of granulation tissue.
   c. The epithelium regenerates, covering the surface defect.
   d. Deposition of collagen results in fibrous union.
   e. Scar maturation occurs as collagen cross-linking takes place.
5. Healing by secondary intention—that is, healing that takes place from the inside out—occurs in large gaping or infected wounds.
6. Factors that can lead to dysfunctional wound healing may be classified as local or systemic.
   a. Local factors include:
      i. Infection
      ii. Inadequate blood supply
      iii. Foreign bodies
   b. Systemic factors include:
      i. Nutrition
      ii. Hematologic abnormalities
      iii. Systemic disease
      iv. Corticosteroid use

VIII. Immunity and the Inflammatory Response

A. Inflammation

1. Inflammation is a protective response to irritation or injury of the body's tissue.
2. It can occur in the absence of an infection, which is the invasion of microorganisms that cause cell or tissue injury.
3. The immune system provides protection for the body by providing defenses to attack and removing foreign organisms such as bacteria and viruses.

B. The immune system

1. The immune system includes all of the structures and processes associated with the body's defense against foreign substances and disease-causing agents.
2. The body has three lines of defense:
    a. Anatomic barriers (skin, nose hairs, and stomach acid)
    b. Inflammatory response
    c. Immune response
3. Together, these three components of the immune system defend the body against foreign substances and disease-causing agents.
4. Anatomy of the immune system
    a. The lymphatic system is a network of capillaries, vessels, ducts, nodes, and organs that help to maintain the fluid environment of the body by producing lymph and conveying it through the body.
        i. Lymph: thin, watery fluid that bathes the tissues of the body. It circulates through lymph vessels and is filtered in lymph nodes. The tiniest lymphatic capillaries unite to form lymph vessels; these vessels eventually coalesce and empty their contents into the central venous circulation.
        ii. Lymphoid tissues: In secondary lymphoid tissues, mature immune cells interact with invaders and initiate a response. Secondary tissues are divided into encapsulated tissues (spleen and lymph nodes) and unencapsulated diffuse lymphoid tissues.
5. Cells of the immune system
    a. Blood contains three types of cells:
        i. Red blood cells (RBCs)
        ii. White blood cells (WBCs)
        iii. Plasma
    b. White blood cells, which are also known as leukocytes, are the primary cells of the immune system. They include:
        i. Basophils
        ii. Mast cells
        iii. Eosinophils
        iv. Neutrophils
        v. Macrophages
        vi. Monocytes
        vii. Lymphocytes

C. The inflammatory response

1. The reaction of the body's tissues after irritation or injury
2. Characterized by:
    a. Pain
    b. Swelling

c. Redness
d. Heat

3. It is triggered by any form of cellular injury. The two most common causes of inflammation are:
   a. Infection (eg, bacterial or viral)
   b. Injury
4. Acute inflammatory response
   a. Involves both vascular and cellular components
   b. The goal of the cellular component of acute inflammation is for inflammatory cells (neutrophils) to arrive at the sites within tissue where they are needed.
   c. The steps of this process include two phases:
      i. An intravascular phase (leukocytes move to the sides of blood vessels and attach to the endothelial cells)
      ii. An extravascular phase (leukocytes travel to the site of inflammation and kill organisms)
5. Systemic inflammatory response
   a. The degree of systemic response to acute inflammation depends on its severity.
   b. Common responses include:
      i. Fever
      ii. Leukocytosis (white blood cell count becomes elevated)
      iii. Increase in circulating plasma proteins or acute-phase reactants (eg, C-reactive protein [CRP])
6. Chronic inflammatory response
   a. Usually caused by an unsuccessful acute inflammatory response due to a(n):
      i. Foreign body
      ii. Persistent infection
      iii. Antigen
   a. The vascular events are similar to those that take place in acute inflammation but also include the growth of new blood vessels (angiogenesis).

D. The immune response

1. Two general types of immune responses are possible:
   a. Native (also called natural or innate immunity)
      i. A nonspecific cellular and humoral (antibody) response that operates as the first line of defense against pathogens
   b. Acquired (also called adaptive immunity)
      i. A highly specific, inducible, and discriminatory method by which armies of cells remember and respond to an immune stimulant

   ii. May be active (occurs as a result of exposure of the body to a foreign substance or disease) or passive (the person receives preformed antibodies to fight or prevent an infection)

2. Both the native and acquired immune responses protect the body from potentially infectious agents (eg, viruses, bacteria) and foreign substances that have gained access to the body through the skin or the lining of the internal organs.
3. Induction of the immune response
   a. The induction phase of the immune response occurs when a part of the immune system recognizes an antigen—any foreign substance.
   b. An antibody binds to a specific antigen so that the complex can attach itself to specialized immune cells that either ingest the complex to destroy it or release biologic mediators such as histamine to induce an allergic/inflammatory response.
      i. In humoral immunity, antibodies are produced by B-cell lymphocytes.
      ii. In cell-mediated immunity, T-cell lymphocytes recognize antigens and either secrete substances (cytokines) that attract other cells or become cytotoxic cells and kill infected or abnormal cells.
   c. For B cells to produce antibodies, they must first be activated. The most common way this occurs is via helper T cells; there is some interaction between humoral and cell-mediated immunity.
4. Age-related differences in the immune response
   a. Both newborns and geriatric patients often exhibit relative impairment of their immune systems, potentially slowing their inflammatory response.
   b. Signs of inflammation are more subtle in these populations.
   c. The immune system does not become fully developed until the child is between 2 and 3 years of age.
   d. Older persons:
      i. Are more prone to infections
      ii. Have increased levels of autoantibodies
      iii. Prone to autoimmune diseases (eg, rheumatoid arthritis, type 1 diabetes, and celiac disease)
      iv. Recover more slowly from infections, and wound healing takes longer

Post-Lecture

Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (**date to be determined by instructor**).

B. Read Chapter 12, “Patient Assessment,” for the next class session.

Chapter 12
Patient Assessment

Unit Summary

After students complete this chapter and the related course work, they will be able to identify the subjective and objective components of a patient assessment in community paramedicine, identify the elements of a patient assessment, describe how to give an effective patient interview, describe how to take a thorough history and the best practices of a comprehensive physical examination, describe the four techniques of a physical examination, discuss the steps of a physical examination, identify vital signs that are assessed, and describe the system review approach to the physical examination in community medicine. Additionally, the students should be able to describe the assessments of a patient's skin; head, eyes, ears, nose, and throat; cardiorespiratory systems; neurologic system; abdomen; and musculoskeletal system.

Objectives

1. Identify the subjective and objective components of a patient assessment in community paramedicine. (p 157)
2. Identify the elements of a patient assessment in community paramedicine. (p 158)
3. Describe the best practices of an effective patient interview. (pp 158, 161)
4. Identify the elements of a thorough patient history in community paramedicine. (pp 162-169)
5. Describe the best practices of a comprehensive physical examination in community paramedicine. (pp 169-173)
6. Describe the four techniques of a physical examination—inspection, palpation, percussion, and auscultation—and explain how and when each technique is performed. (pp 173-175)
7. Explain the process of performing a general assessment. (p 176)
8. Identify the vital signs that are assessed during the physical examination in community paramedicine. (pp 176-180)
9. Describe the system review approach to the physical examination used in community paramedicine. (pp 180-181)
10. Describe the assessment of the patient's skin. (pp 181-183)
11. Describe the assessment of the patient's head, eyes, ears, nose, and throat. (pp 181-186)

12. Describe the assessment of the patient's cardiorespiratory systems, and explain why the cardiovascular and respiratory systems are assessed together. (pp 186-193)
13. Describe the assessment of the patient's neurologic system. (pp 193-200)
14. Describe the assessment of the patient's abdomen. (pp 200-201)
15. Describe the assessment of the patient's musculoskeletal system. (pp 201-204)
16. Explain the importance of documentation of the patient assessment. (p 204)

Readings and Preparation

- Review all instructional materials including ***Community Health Paramedicine***, Chapter 12, and all related presentation support materials.
- Review local protocols relating to elements of patient assessments in community medicine, interviewing patients, the techniques used in a comprehensive physical examination, performing a general assessment, assessing vital signs, and assessments relating to a patient's specific body parts and systems.

Support Materials

- Lecture PowerPoint presentation

Enhancements

- Direct students to visit Navigate 2.
- Provide copies of local protocols.

Unit Activities

Writing assignments: Instruct each student to put together a scenario for a patient assessment.

Student presentations: Divide students into groups. Instruct each group to act out the patient assessment scenario (developed for the writing assignment) for the rest of the class.

Group activities: Discuss and critique each student presentation as a group. Discuss problems regarding the subjective and objective components of a patient assessment in community paramedicine, the elements of a patient assessment in community paramedicine, obtaining a thorough patient history, the process of performing a general assessment, and privacy issues involved in a comprehensive examination.

Pre-Lecture

You are the Community Paramedic

"You are the Community Paramedic" is an opening case study that encourages critical thinking skills.

Instructor Directions

1. Direct students to read the "You are the Community Paramedic" scenario found a the beginning of Chapter 12.
2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question.
3. You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. Patient assessment

1. Compared to the traditional paramedic in the field, the community paramedic has the luxury of time to perform a more detailed and comprehensive assessment of the patient.
   a. Traditional paramedics work in time-sensitive and critical settings.
2. Adapting the patient assessment to the nonemergency environment may require some adjustments in goal setting.
3. This chapter outlines a comprehensive approach for conducting a thorough, systematic assessment of patients in a less time-sensitive manner.

II. Purpose and Importance of Patient Assessment

A. Understanding the patient assessment

1. Patient assessment has long been regarded as one of the most important skills of the traditional paramedic.
2. The actual patient assessment does not constitute a lifesaving intervention; it sets the stage for the paramedic's actions to mitigate emergencies of all types.
3. Every intervention, therapeutic regimen, and predicted outcome is based on the findings from the patient assessment.

4. For this reason, a thorough understanding of each of the essential components of a patient assessment is critical.

B. Components of the patient assessment

1. The patient assessment consists of both subjective and objective components.
   a. The subjective component is provided to the community paramedic by the patient or family member.
   b. It is subject to interpretation by others.
      i. For example, if a family member witnesses the patient experiencing a seizure, the description of the nature and duration of the seizure is entirely dependent on the family member's report.
      ii. Unfortunately, eyewitness accounts are not always reliable.
   c. To obtain more precise information about the patient's condition, health care providers must include an objective component to supplement the subjective perspective.
   d. Subjective patient information is often described as symptoms (any finding that can be ascertained only through the patient's reporting).
      i. Examples: headache, chest pain, nausea, dizziness, blurred vision
2. The objective aspect of patient assessment is the information that the health care provider obtains by conducting a systematic physical examination of the patient.
   a. This objective information is used to reinforce, supplement, or verify the findings obtained from the subjective assessment.
   b. The combination of subjective and objective findings provides the most comprehensive understanding of the patient's problem or underlying illness or injury.
   c. If the community paramedic identifies the clinical finding by examining the patient, that condition is objective and often referred to as a sign.
      i. Examples: swelling, discoloration, petechiae, crackles, and dysconjugate gaze
3. The distinctions between subjective and objective findings are important in:
   a. Organizing patient information
   b. Reporting patient information
   c. Maintaining consistency among various health care providers
4. Subjective patient information (symptoms) is obtained during history taking, whereas objective patient information (signs) is obtained during the physical examination.

C. Goals of patient assessment

1. The ultimate responsibility of diagnosing the patient rests with the primary care physician.
2. The community paramedic's role is to supplement that care with ongoing monitoring and management.

3. Reaffirm the primary care physician's findings and monitor the patient for changes and developing trends
4. The community paramedic must possess a foundational understanding of the comprehensive patient assessment, which often entails:
    a. Extensive knowledge of various pathophysiologies
    b. Consideration of differential diagnoses
    c. Formulation of a working diagnosis
    d. Typical clinical presentation of that working diagnosis
        i. A working diagnosis: the presumed explanation for the patient's current illness or injury that guides the remaining history and the physical examination and can be revised upon further discoveries of clinical findings

D. Integration of patient assessment into the practice of community paramedicine

1. Given that the patient assessment in community paramedicine is less time sensitive and of a less urgent nature, it can be more detailed and comprehensive in scope than is the assessment performed in an emergency situation.
    a. This comprehensive patient assessment serves the goals of community paramedicine well, as promoting primary and preventive care are essential elements of this new initiative.
    b. Because the goals of community paramedicine differ from the traditional goals of emergency medical services (EMS), the process of patient assessment also differs somewhat.
2. Patient assessments in community paramedicine are essentially more akin to those performed by primary care providers.
3. The community paramedic's patient assessment informs the following specialists about a patient's current health status:
    a. Primary care physician
    b. Rehabilitation specialist
    c. Home health care nurse
    d. Case manager
    e. Insurer

III. Patient Assessment Overview

A. Patient assessment differences

1. In many fundamental ways, the patient assessment process for community paramedicine resembles the traditional practices employed in emergency paramedicine.
2. At the same time, there are differences in these processes related to the:
    a. Scope
    b. Comprehensiveness

3. Specifically, in the community paramedicine setting, more time can be spent detailing aspects of the patient history and several areas of physical examination can be expanded to reveal more clinical information.

B. Elements of the patient assessment

1. The general content and format for conducting a patient assessment for community paramedicine are:
   a. General information
   b. Chief complaint
   c. History of present illness
   d. Past medical history
   e. Family medical history
   f. Social history
   g. Medications and allergies
   h. General assessment
   i. Vital signs
   j. Review of systems
2. The information learned through the history-taking process is used to guide the physical examination process.
3. Knowing specific information will inform the community paramedic about which areas of the body demand greater attention during the physical examination.
   a. Patient's chief complaint
   b. Details of the current illness
   c. Past medical diseases

C. Guidelines for effective patient assessment

1. Be prepared.
   a. Review the patient's plan of care. Review previous medical records, especially if you are seeing the patient for the first time. Ideally, you will have access to electronic health records for review and annotation.
2. Greet the patient with friendliness and professionalism.
   a. Maintaining a professional demeanor, attire, and affect can easily be merged with an open and friendly approach.
3. Provide the best environment for the patient assessment.
   a. Both the interview and the physical examination should be conducted in a location that has good lighting, heating or cooling, and is well protected and private. In community paramedicine, that environment will usually be in the patient's home. Always respect the patient's wishes and privacy.
4. Inform the patient of the expected events.
   a. Describe to the patient how you anticipate the assessment to proceed. Describe the interview process and the physical examination process, and

emphasize their importance. Avoid surprising the patient. If you anticipate the need to draw blood, let the patient know at the beginning of the visit.

5. Use discretion when taking notes.
    a. While it is important to take notes during the interview, do not allow the note-taking process to overshadow your interaction with the patient. If you need to record some important information, ask the patient to pause while you write your notes.
6. Begin with general, demographic information.
    a. This is usually information such as age, ethnic group, living relatives, medical records information, and similar general information. Sometimes you merely need to confirm the information that you already have on record.
7. Elicit the patient's chief complaint and history of present illness.
    a. The patient should describe the chief complaint in his or her own words and explain the circumstances surrounding it.
8. Elicit past medical information.
    a. This information may include past medical and surgical histories, family history, social history, medications, and known allergies.
9. Perform the physical examination.
    a. Once all of the subjective information is obtained, prepare for and begin the physical examination. Remember, the physical examination is guided by your findings derived from the history.
10. Gather any lab values or information from medical devices.
    a. Depending on the patient's circumstances and your local protocols, you might obtain an electrocardiogram (ECG), perform respiratory function tests, or draw blood samples for further testing.
11. Conclude with any recommended courses of action or interventions.
    a. Make sure you are approved to perform these actions by the medical director or local protocols. If interventions are part of the patient's plan of care, you may be required to administer treatments, recommend referrals, or facilitate follow-up visits with you or other health care agencies.

D. Integration of electronic health record, medical device, and lab testing information

1. Information from other sources can help in determining the nature of the patient's condition or disease progression. Such information typically includes data from medical devices and reports from the health care team.
    a. Electronic health record (EHR)
    b. 12-lead ECG, especially with pulse oximetry and capnography findings
2. For example, in pulmonary function assessment, spirometry and peak expiratory flow measurements can provide meaningful information about patient status and improvement.
3. Electronic devices, such as peak flow meters, for obtaining these measurements are inexpensive, portable, and easy to use.

4. When the community paramedic makes multiple visits to the same patient, a few of the patient's numbers can be serially measured and recorded:
   a. Forced expiratory volume (FEV)
   b. Peak expiratory flow rate (PEFR)
   c. Other pulmonary function tests may be useful in specific patient populations.
5. Point-of-care tests: diagnostic process of gathering clinical data (usually chemistry or laboratory values) from the patient while at the patient's bedside.
   a. Results are usually available through a portable analysis shortly after obtaining the specimen.

IV. History Taking and Conducting the Patient Interview

A. History taking

1. The first part of the patient assessment in most community paramedicine settings focuses on obtaining the patient history.
2. This section reviews some of the basic principles and practices of history taking and reinforces some of the key points for success.

B. Professional demeanor

1. Traditional paramedics are accustomed to maintaining a stoic and controlled professional demeanor in situations of urgency and life-threatening circumstances.
2. The community paramedic should strive for a more collaborative and supportive demeanor.
   a. The community paramedic is seeking to enable a more relaxed and holistic approach to the patient's needs.
3. The community paramedic should try to gather as much meaningful information as possible in an interested, facilitative, and casual manner. The community paramedic should:
   a. Maintain patient confidentiality
   b. Demonstrate respect for privacy
   c. Promote good health practices among patient behaviors
   d. Be respectful
   e. Be nonjudgmental
   f. Practice good communication skills

C. Body language

1. Critical to professional demeanor is the proper use of body language.
   a. Exhibiting a relaxed but interested demeanor can be facilitated by:
      i. Sitting with the patient
      ii. Directing your full attention to him or her while the patient explains the medical history or recent events

iii. Nodding occasionally to acknowledge your understanding

b. The community paramedic should avoid:
   i. Standing while the patient sits
   ii. Annotating information onto a document or electronic device while asking questions
   iii. Performing other tasks while conversing with the patient.
   iv. These types of behaviors may demonstrate disinterest.

2. Use closed-loop communication: the provider ensures clarity and effectiveness of communication by actively listening to the patient and then verifying that he or she understood the patient by restating the information.
3. Some behaviors and gestures that facilitate effective communication are:
   a. Listening with your head slightly tilted to one side
   b. Maintaining direct eye contact
   c. Leaning forward slightly while listening
   d. Avoiding interruptions while the patient speaks
   e. Confirming receipt of the information with an occasional "I see" comment
   f. Displaying appropriate facial expressions that are consistent with the message's intent
4. Many behaviors or gestures are not conducive to effective communication:
   a. Standing while patient sits
   b. Not maintaining eye contact
   c. Crossing your arms/hands on your hips
   d. Talking to others while the patient is talking

D. Open-ended questions

1. Patient interviews typically begin with open-ended questions.
2. Open-ended questions:
   a. Allow the patient to volunteer information freely
   b. Do not bias the patient's responses
   c. Can encourage patients to give lengthy and rambling responses
3. The combination of open discussion and guided inquiry often yields the most meaningful information.
   a. A common approach to combining open-ended questions with more focused questioning is to begin with open-ended questions and progress toward questions that are more direct and that can be answered in only a limited manner (ie, closed-ended questions).
   b. This broad-to-focused line of questioning will help focus the collection of vital patient information, using the patient's responses to the open-ended questions to help inform the nature of the closed-ended questions.

E. Closed-ended questions

1. While open-ended questions are generally preferred, on some occasions a closed-ended question is necessary.
2. The community paramedic should use closed-ended questions:
   a. When the patient's answers are too rambling
   b. During emergencies or urgent conditions
   c. To conclude, verify, or narrow the patient's responses
   d. When he or she needs specifics
3. This method is particularly useful when bringing closure to a history-taking interview and affords an opportunity to reaffirm the information provided.
4. The goal of closed-ended questions is to follow up and gather further detail on the patient's condition.
5. Active listening
   a. Obtaining a history from a patient is more similar to a guided tutorial than to the dialogue that occurs in a conversation.
   b. This process should be seen as an opportunity to hear what the patient has to tell you, albeit one aided by some guidance and prompting.
   c. Active listening begins with building a rapport with the patient.
   d. You should position yourself physically in such a way to eliminate any barriers to communication or any demonstration of authority.
   e. Sit with the patient, speak to the patient pleasantly and calmly, and maintain eye contact as much as is reasonably possible.
   f. Ask relevant questions, and allow the patient ample time to respond.
   g. It is important to echo or restate what the patient has already told you.
   h. This feedback technique facilitates two objectives: It shows the patient you are paying attention, and it confirms your understanding of what the patient said to you.
   i. Some gestures and movements indicate interest, such as nodding and leaning forward.

F. Challenges in history taking

1. Experience will help you navigate through some of the simpler challenges, but having an effective strategy before starting the interview will help you negotiate the greater challenges.
2. Some types of patients you could have include:
   a. Silent patients
      i. A patient may be embarrassed, intimidated, depressed, or mistrustful, have communication barriers, or may simply be trying to recall events.
      ii. Allow silence to occur to some extent.
      iii. If silence is obstructive to history taking, you should encourage responses and prompt for more direct answers.

b. Overly talkative patients
    i. Allow these patients an opportunity to speak freely for a while. Allowing them the opportunity to talk will often build a rapport.
    ii. If talkativeness is a problem, try to refocus the interview toward meaningful discussions. Ask them their number-one concern.
    iii. Be aware of any dissociated thoughts or "flight of ideas" (may indicate an underlying psychiatric disorder).
c. Angry or hostile patients
    i. Discovering the source of the anger or resentment is often restorative.
    ii. Uncovering the source of a patient's frustration may be as simple as allowing the patient to express any frustration, or it may require some gentle prodding.
    iii. Showing understanding and empathy may help to dismantle barriers to the history-taking process.
    iv. Recognize that you are not always in a position to bring about change in the process but are merely there to report the patient's concerns to the appropriate authorities.
d. Confusing behavior or history
    i. Your first consideration is to determine if the confused responses are the result of altered mental status. If not, you should attempt to modify the interview in such a way as to provide structure and purpose.
    ii. You might have to abandon open-ended questions and resort to direct, simple questions with yes and no answers.
e. Patients with language barriers and limited comprehension
    i. If language barriers, arrange for a translator to be present.
    ii. Remember, differences lie not only in language, but also in cultural preferences.
    iii. If a patient has limited comprehension, keep your questioning simple and direct.
    iv. Verify every patient's full understanding of your questions, instructions, and expectations. Be sure to clearly document all communication.
f. Patients with sensory losses
    i. Patients who receive care through a community paramedicine program may be older and may have experienced some sensory loss.
    ii. The patient with limited vision might need better lighting, or you may need to sit closer to put the patient at ease.
    iii. If the patient is blind, you should introduce yourself and anyone else in the room and seek permission to touch the patient before doing so. Be careful not to move furniture.
    iv. Patients with hearing loss should be offered their hearing aids for use; have them repeat what you said. Speak directly to them, using a clear and normal voice.

v. Many patients with speech disorders can be understood with some effort, full attention, and patience. Patients may need to write down responses or have a family member help you decipher. Patience is important.

G. Important aspects of the history

1. General information
   a. Date and time of the patient assessment
   b. Patient's name
   c. Date of birth
   d. Gender
   e. Ethnicity
   f. Any other important general information that does not fall under a prescribed category
   g. Verify any information that was gathered from any existing records with the patient.
2. Chief complaint
   a. The chief complaint is the patient's statement of the problem at hand in the patient's own words.
   b. Be sure to record the patient's statement verbatim, and place this statement within quotation marks.
   c. If it is appropriate to use a surrogate historian for the patient's chief complaint, such as for a patient with dementia or a cognitive deficit, be sure to record that circumstance clearly (eg, "according to wife").
   d. If no chief complaint exists, document the reason for the patient assessment.
      i. It might be useful to note the discharge diagnosis or the reason for the ongoing evaluative assessments.
3. History of present illness
   a. This component modifies and explores the chief complaint.
   b. The mnemonic OPQRST-ASPN is a useful tool in community paramedicine for describing the present illness and incorporates:
      i. Onset
      ii. Provocation/palliation
      iii. Quality
      iv. Region/radiation
      v. Severity
      vi. Time (temporal aspects)
      vii. Associated symptoms
      viii. Pertinent negatives

4. Past medical history
    a. In traditional emergency paramedicine, the past medical history is usually limited to relevant medical and surgical histories that may impact the current course of the present illness.
    b. In community paramedicine, it is prudent to spend more time seeking a comprehensive and thorough past history.
    c. In primary care, the elements of past histories are often organized into five areas:
        i. Childhood illnesses
        ii. Medical history
        iii. Surgical history
        iv. Obstetric and gynecologic history
        v. Psychiatric history
    d. In this text, the childhood and medical histories will be considered together, the psychiatric history will be taken according to local protocols, and the obstetric and gynecologic history will be deferred.
5. Family medical history
    a. Traditionally, paramedics have rarely sought to obtain a detailed family history due to the emergent nature of their patients' medical problems.
    b. In community paramedicine, this aspect of the patient's past history is important, and the time available generally allows for a thorough investigation of the family history.
    c. Completing this history requires a somewhat systematic approach in seeking information for each of the patient's nearest relatives.
        i. Begin with the parents
        ii. Identify chronic or serious diseases
        iii. Ask questions about the grandparents
        iv. Inquire about health of siblings
        v. Seek the same information for any and all living children of the patient
        vi. It may be helpful to remind the patient of the most common and impactful diseases.
6. Social history
    a. An evaluation of a patient's social history is highly important in the community paramedicine setting.
    b. Patients cared for under community paramedicine programs may be older, may have multiple disabilities, and may have an increased burden due to their chronic diseases.
    c. Their social network may be more important to them than the social network of the independent, working adult.
    d. Begin with inquiries about the availability and access to family members or others who can provide support.

e. Ask about social clubs, group activities, and community support groups.
f. Other aspects of the social history include the patient's personal interests, activities of daily living (ADLs), coping style and resources for dealing with crises, exercise regimens, dietary restrictions, lifestyle habits, perceived strengths and fears, level of education, and past occupations.
g. These activities and assessments may have already been performed by a social worker; if so, the community paramedic may be able to access that information in an integrated EHR system.

7. Medications and allergies
   a. A comprehensive list of all medications is an essential part of the subjective assessment.
   b. All prescribed medications (current and past) should be documented with generic and trade names, dosages, prescribing information, and quantities remaining.
   c. Inventory all medications with the name of the prescribing physician, the expiration dates, and the quantities remaining.
   d. Inspect the medication containers to verify dosages, prescribing information, and expiration dates.
   e. Also inquire about use of over-the-counter medications, home remedies, herbal preparations, vitamins, and any other supplements.
   f. When inquiring about allergies, be sure to include food and environmental allergies in addition to medication allergies.

VII. The Physical Examination: An Overview

A. Conducting the physical examination

1. Once you have obtained a thorough history, it is time to begin the physical examination.
2. Some people may be reluctant to undergo this part of the patient assessment, for any number of reasons:
   a. Modesty
   b. Feeling vulnerable
   c. Anxiety over a stranger touching them
   d. Discomfort/exhaustion caused by the physical exam
3. To alleviate their concerns and discomfort, try to be as systematic and thorough as you can without delaying the process or repeating unrevealing procedures. Be gentle yet deliberate.
4. As a community paramedic, you should prepare not only the patient, but also yourself to carry out the physical examination.
5. Maintain a systematic approach, transition from one body system to the next without delay, be pleasant with the patient and offer relevant details to help alleviate any patient anxieties, and provide patient privacy throughout the process.

6. During the physical examination, tell the patient what to expect and explain the purpose of each step.
7. If a patient asks what you found during any portion of your physical examination, try not to be evasive with your answer. Instead, you may report some aspect of your findings or distract the patient by asking a question of your own, such as, "Why do you ask? Do you have any concerns about this?"

B. Using the history to guide the physical examination

1. In an unconscious patient, the history taking may have been skipped, so that no subjective information is available.
   a. In such a case, the physical examination must be inclusive and comprehensive to uncover the underlying problems.
2. In patients who provide a meaningful history, the relevant information from this step can be used to guide your physical examination.
3. The history-taking process is not intended to circumvent or abbreviate aspects of the physical examination.
4. A thorough history enables the community paramedic to focus on areas of the physical examination that were identified as problematic during the patient interview.
5. In most instances, the physical examination reaffirms existing suspicions revealed during the history-taking process.

C. Requirements for an effective physical examination

1. The physical examination is an important part of the overall patient assessment, and it should be conducted in a thorough and systematic manner.
2. Certain aspects of the physical examination must be considered for each patient on every occasion.
3. Environment
   a. Selecting the appropriate environment for the physical examination will not only ensure an effective process, but may also to help put the patient at ease.
   b. The location should be private, well lighted, warm, and convenient for the patient.
   c. It is best to ask the patient where he or she would prefer the physical examination to take place, but as the examiner, you should consider the process and your own needs in this role. It should be a collaborative decision.
   d. Prior to beginning the physical examination, be sure to either wash your hands with warm, soapy water or use a hand sanitizer. Do the same immediately after the physical examination.
4. Equipment
   a. Having all of the necessary equipment at your disposal is important.
   b. While you might not need to bring all of the traditional EMS equipment that is used in an emergency into the patient's home, there are some pieces that you will certainly need.

   i. EMS agencies that are providing community paramedicine services sometimes outfit special kits for the purposes of community paramedicine activities only.

c. The equipment used in the physical examination may vary based on the:
   i. Nature of the patient's illness
   ii. Scope of the community paramedicine program
   iii. Skill sets of the community paramedic
d. Typical equipment needs are listed in Table 12-1.
e. The stethoscope is one of the most essential pieces of equipment for the community paramedic, so it should be of a high quality and be well maintained.
e. You should have some timepiece with a second hand or function with which you can record rates, whether it is a watch or a portable timing device.
f. As part of your kit, you should have an ample supply of gloves at your disposal.
g. To assess reflexes, you should employ a reflex hammer.
h. The patient's vital signs include:
   i. Pulse
   ii. Respiratory rate
   iii. Blood pressure
   iv. Temperature
i. Be sure to have the equipment to measure these vitals readily available. The set of blood pressure cuffs should include adult and bariatric sizes as well as pediatric sizes for any adults with emaciated arms.
j. The temperature measurement device may be of any type, but many health care providers prefer the electronic, tympanic thermometer.
   i. You can also use electronic oral or temporal temperature measurement devices, but recognize that these devices are not as accurate.
k. A cloth or paper tape measure is invaluable for taking the abdominal girth measurements of patients with heart failure.
l. Depending on your system and the objectives of your community paramedicine services, you may be required to obtain patient weights with a reliable, calibrated scale.
m. In eye examinations, pen lights can be used to find pupillary responses to light and a gross assessment of anterior chamber depth.
n. Additional visual assessment may include visual acuity using an assessment card.
   i. Ophthalmoscopic examination is an advanced skill that is occasionally being incorporated into community paramedicine practice.
   ii. If these services are offered, the community paramedic should have a quality combination ophthalmoscope and otoscope available.

   o. Oral examination may necessitate the use of a disposable wooden or plastic tongue blade.
   p. A comprehensive neurologic examination may include a sensory assessment of touch discrimination using two safety pins or paperclips for two-point discrimination and a cotton swab.
   q. The standard 12-lead ECG machine is essential, as is a portable pulse oximeter and capnography device.
      i. Twelve-lead ECG machines may include these features as well.
5. Provider–patient rapport
   a. Your ability to conduct an effective physical examination will be heavily influenced by the rapport you have established with the patient.
   b. Once patients develop confidence and trust in health care providers, they tend to become more cooperative and tolerant of the patient assessment process and may be more accepting of the physical examination.
6. Patient privacy
   a. Privacy means different things to different people. You will most likely not be aware of the level of modesty the patient has until you begin the physical examination process.
   b. Therefore, it is important to employ a systematic methodology to establish and maintain patient privacy for each patient.
   c. If you adhere to strict privacy guidelines for all patients in all components of the physical examination, you will be much less likely to offend or embarrass any particular patient.
   d. You should conduct your interview of the patient in a private area where others cannot hear or see you and the patient.
   e. All notes from the interview and medical records, including lab values, must be kept confidential.
7. Setting expectations
   a. After the patient interview, you will have a good idea as to what you will be looking for in the physical examination.
   b. Despite this focused approach, the physical examination process should still be systematic and include all relevant body systems.
   c. Explain to the patient beforehand how the physical examination will unfold.
   d. By preparing the patient, you help to allay any anxiety that the patient may have while simultaneously setting the stage for the physical examination without imposing limitations.

D. Role and importance of the physical examination

1. While the information gathered by history taking is revealing, the physical examination is essential to determine the true nature of the patient's problem.
2. Combining the subjective information from the history with the objective information from the physical examination is the most effective and reliable means of conducting a proper patient assessment.

3. Get into the practice of conducting at least the most relevant aspects of the physical examination for every patient, and try to be as inclusive and thorough as you reasonably can each time.

E. General principles in conducting an effective physical examination

1. Four major techniques are used when performing a physical examination:
   a. Inspection
   b. Palpation
   c. Percussion
   d. Auscultation
2. Inspection
   a. Inspection is the visual examination of the body in an effort to identify features and abnormalities.
   b. Inspection may involve examination and assessment of:
      i. Skin and external body structures
      ii. Facial expressions
      iii. Movements
      iv. Mood
      v. Behavior
   c. Given that inspection is the least invasive of the techniques of examination, it is often performed first during the physical examination.
   d. For inspection to be effective and reliable, adequate lighting is necessary and the body region under inspection must be free of clothing.
3. Palpation
   a. Palpation is the technique of feeling regions of the body.
   b. Superficial (light) palpation
      i. Focuses on the sensory function of feeling the surface of the body in an effort to detect superficial abnormalities such as small elevations, depressions, texture, and turgor
      ii. Can be accomplished with the fingers of one hand gently pressed upon the surface
   c. Deep palpation
      i. Involves greater digital pressure, usually aided by the other hand
      ii. Allows the community paramedic to not only feel the shape, size, and location of internal structures, but also identify any tenderness, vibratory sensations (thrills), pulsations, or masses
      iii. Usually reserved for the abdomen and pelvic region
   d. Both types rely on the sensory function of feeling using the finger pads of the hand.

4. Percussion
    a. Percussion is used in a limited fashion in traditional paramedicine but has significant value in community paramedicine.
    b. With this technique, the community paramedic seeks to elicit sounds or tones by striking the surface of the body either directly or indirectly.
    c. The tissue beneath the areas being struck will generate varying tones depending on the density of that tissue. Eliciting these tones through percussion allows the community paramedic to discern the nature of the underlying tissue.
    d. The sounds of percussion are influenced not only by the density of the tissue, but also the following qualities of the structure under the body surface:
        i. Depth
        ii. Position
        iii. Size
    e. Two forms of percussion are used:
        i. Direct percussion: action of striking the body surface directly with either the fingers or an instrument
        ii. Indirect percussion: involves the use of an intermediary material, most often a finger, to soften the blow of percussion and make it more comfortable
5. Auscultation
    a. Involves listening to sounds inside the body, usually with the aid of a stethoscope
    b. In proper auscultation, you should be consciously listening for specific sounds depending on where the stethoscope's headpiece is placed and which pathologies you suspect currently exist.
    c. Like percussion, auscultation is best performed in a quiet environment.
6. Order of techniques
    a. In general, the least invasive of these four techniques is performed first, and the most invasive is saved for last.
    b. Typically inspection is followed by auscultation, then percussion, and finally palpation.

VIII. Conducting the Physical Examination

A. Customizing the physical examination

1. The stepwise progression of the physical examination can change and be customized to:
    a. Suit current needs
    b. Address areas of concern that demand a more focused assessment
    c. Meet personal preferences

2. The order that is most typical and consistent with medical practice is:
    a. General assessment
    b. Vital signs
    c. Systems review

B. General assessment

1. The physical examination begins with a general assessment of the patient.
2. A cursory look at the patient's overall status, looking for obvious indicators of:
    a. Disease
    b. Disabilities
    c. Poor health
3. "Stepping back" and getting a general impression of the patient
4. General appearance
    a. Observing the patient's behavior, alertness, habits of grooming, personal hygiene, facial expressions, and demeanor will provide helpful clues to the patient's condition and underlying disorders.
    b. Also note the patient's body appearance and movements.
        i. Bradykinesia
        ii. Kyphosis
        iii. Scoliosis
        iv. Hemiplegia
        v. Hemiparesis
5. Positions of comfort
    a. Whether the patient is sitting comfortably upright or lying in a fetal position holds great meaning and can lead to insights into the patient's condition.
        i. Tripod position
        ii. Orthopnea
        iii. Exertional dyspnea
        iv. Peritonitis
    b. Noting the position the patient naturally assumes is a very helpful clue as to possible underlying problems.
    c. Notice how willing the patient is to assume different positions during the physical examination.
6. Level of distress or discomfort
    a. This is an objective assessment; it is your interpretation of the patient's level of distress based on your clinical experience.
    b. During this step, you should observe and report how the patient appears to you with regard to any distress or discomfort the patient is experiencing.
    c. It is often useful to compare your objective assessment with the patient's subjective expression of pain or difficulties.

d. Assessments from both perspectives allow for a more in-depth interpretation of the clinical findings.

C. Vital signs

1. Vital signs are a common assessment objective in EMS and most other health care professions.
2. Frequently, when vital signs become abnormal, that reflects an already evolving pathology.
3. Vital signs should be obtained anytime a physical examination is conducted.
4. In community paramedicine, obtaining serial vital signs may mean measuring them at every patient visit.
5. During your visit with your patient, you may want to obtain a set of vital signs shortly after you arrive and another set just before leaving.
6. Many regard vital signs as only the pulse, blood pressure, respiratory rate, and temperature; others include pulse oximetry, and the patient's weight and height.
7. Pulse
   a. Pulse checks are a fairly routine vital sign measurement.
   b. Measurements of the pulse typically can be obtained at the wrist.
   c. When checking the pulse, be sure to assess the rate, rhythm, and quality of the pulse.
   d. Be sure to evaluate any fluctuations or variations in amplitude with individual pulse waves.
8. Respirations
   a. Respirations should be assessed for:
      i. Rate
      ii. Quality
      iii. Rhythm
   b. The rate of respirations, like the pulse, should be obtained over the duration of a full minute.
   c. Because respirations are under some voluntary influence, you should make an effort to be inconspicuous when checking the respirations for rate and depth.
   d. The rhythm of respirations can easily be observed while determining the respiratory rate.
   e. Slight variations of rhythm may exist and are considered normal.
9. Blood pressure
   a. General considerations for measuring blood pressure:
      i. Cuff selection
      ii. Position of the cuff
      iii. Position of the stethoscope
      iv. Inflation of the cuff
      v. Korotkoff sounds

10. Temperature
    a. Temperature should be routinely obtained by the community paramedic.
    b. Patient temperatures may vary depending on the time of day and the patient's activity immediately preceding the temperature measurement.
    c. The body site where you obtain the temperature may affect the result, so be sure to indicate this site when documenting the values.
    d. Most temperatures are obtained:
        i. Orally
        ii. Rectally
        iii. Temporally
        iv. From the tympanic membrane
11. Pulse oximetry
    a. Pulse oximetry is a technology that approximates the oxygen saturation of hemoglobin in the arterial blood system by electronically analyzing emitted and reflected red and infrared light as it moves through cutaneous tissue.
    b. Given the miniaturization of pulse oximetry technology and its incorporation into most cardioscope/defibrillators, pulse oximetry should be considered a routine part of patient assessment in community paramedicine.
12. Weight and height
    a. Accurate measurements of the patient's weight and height should be a regular part of the community paramedic's assessment of patients.
    b. When weighing patients who can cooperate with the process, try to weigh them at the same time of day during each visit and with the same amount of clothing.

D. Systems review

1. Traditional paramedics are taught and subsequently become accustomed to performing a physical examination from the top of the head down to the toes in a progressive manner.
2. In a less urgent environment, the community paramedic can perform a more systematic review of physiologic body systems.
3. With this approach, the community paramedic may pay more attention to associated findings within a single body system.
    a. If the patient's chief complaint is "shortness of breath," you might want to focus your physical examination on the cardiorespiratory system.
4. Note that you can still start at the head and proceed toward the feet, but your process will be to examine one body system and then the next.
5. The system review process is usually performed in the following order:
    a. Skin
    b. Head, eyes, ears, nose, and throat
    c. Cardiorespiratory systems (thorax)
    d. Neurologic system

e. Gastrointestinal system (abdomen)
f. Musculoskeletal system

6. Skin assessment
   a. The skin review will include an assessment of the hair and the nails.
   b. Be sure to examine the skin under good lighting, and protect the privacy of the patient throughout the examination, while still examining all skin areas as necessary.
   c. Assess the patient's:
      i. General skin color
      ii. Moisture
      iii. Turgor
      iv. Temperature
   d. Look for cyanosis or coloration changes.
   e. Assess for skin turgor on the dorsum of the hand and anterior to the tragus of the ear.
   f. Examine the body for evidence of lesions or localized anomalies.
      i. Petechiae
      ii. Purpura
      iii. Macules
      iv. Vesicles, nodules, papules, and pustules
   g. Patterns of distribution of skin rashes and lesions are also important.
      i. Example: The malar rash (butterfly rash) of patients with systemic lupus erythematosus.
   h. Check for pressure ulcerations for patients who have limited mobility, are bedridden, or have neurologic deficits.
7. Head, eyes, ears, nose, and throat assessment
   a. When incorporating the head-to-toe approach into the review of systems methodology, it is logical to begin at the patient's head.
   b. Assessment of the head
      i. Assess for any gross abnormalities, twitching, spasms or lid ptosis
   c. Assessment of the eyes
      i. Under very rare circumstances you may be asked to undertake a systematic and thorough ocular examination.
      ii. The external examination of the eyes should begin with an inspection of the conjunctiva, checking for redness or yellow discoloration.
      iii. After inspecting the external eye, shine a light at each pupil to assess its reactivity to light and assess for extraocular motion.
      iv. A gross visual acuity is also performed as part of eye assessment.

v. An ophthalmoscopic examination of the eye by a community paramedic can be used effectively to identify basic anomalies and evidence of underlying systemic diseases.

d. Assessment of the ears
   i. Examination of the ears should consist of a brief external and otoscopic assessment.
   ii. Most auditory tests are best carried out in a controlled environment with specialized audiometry equipment.
   iii. If the patient has any ear complaints, be sure to examine the unaffected ear first.
   iv. An otoscopic examination for the adult involves gently retracting the auricle in the posterior-superior direction, thereby aligning the auditory canal so that you can visualize its interior.
   v. The main objective in using the otoscope in community paramedicine is to identify any evidence of infection in the ear or perforation of the eardrum.

f. Assessment of the nose
   i. In most instances, the examination of the nose is motivated by specific complaints during the history that would demand such an examination.
   ii. Grossly examine the nose for any bleeding or discharge, discoloration, obstruction, asymmetry, or deviation that might cause a partial obstruction.
   iii. If an obstruction or infection is suspected, carefully examine the anterior vestibule of the nasal cavity with the otoscope; it may be necessary to use the largest speculum for this purpose.

g. Assessment of the throat
   i. Examination of the throat begins with a visual examination of the oral cavity and continues with an external assessment of the neck.
   ii. Depending on the community paramedicine program, the lymph nodes and thyroid may also be examined.

8. Cardiorespiratory assessment
   a. Since the cardiovascular and the respiratory body systems are so interdependent anatomically and physiologically, they can be assessed together.
   b. Patients with underlying disease of one of the two systems often present with symptoms in both body systems.
   c. Assess both systems together to discover abnormalities and positive findings.
   d. The cardiorespiratory assessment is likely to be one of the more important assessments and one of the most commonly conducted by a community paramedic.
   e. The cardiorespiratory assessment requires all four techniques of examination and is largely focused on the thoracic region.

f. It is important that the preparation for this component of the examination ensures:
    i. Adequate lighting
    ii. Comfortable temperatures
    iii. Easy access to the patient's body regions
g. A systematic approach to the cardiorespiratory assessment that is applied consistently will help you identify subtle findings and prevent you from overlooking any relevant clinical findings.
h. Inspection and palpation of the posterior thorax
    i. The cardiorespiratory assessment begins with an inspection of the posterior thorax.
    ii. This must be done with the patient's back fully exposed.
    iii. Inspect the posterior thorax for any obvious deformities, asymmetry, scoliosis or kyphosis, scars, rashes, and general shape.
    iv. Assess for tactile (or vocal) fremitus—a vibration transmitted from the tracheobronchial tree through tissue.
i. Percussion of the posterior thorax
    i. Next, percuss the posterior thorax using indirect percussion.
    ii. Now, strike the distal phalanx with the tip of the flexed middle finger of the other hand with a sharp, firm blow.
    iii. As you percuss the chest, listen for the tones or sounds the percussion produces.
    iv. The sounds produced by percussion will likely vary in intensity, pitch, and duration.
j. Auscultation of lung sounds
    i. Auscultation of lungs with a stethoscope offers an even more refined assessment of the respiratory system.
    ii. The process of auscultation typically involves three primary objectives: (1) listening to the sounds produced by the breathing process, (2) listening for any abnormal or additional (adventitious) sounds produced by disease, and (3) listening for sound transmission from the spoken words to the areas of suspected pathology.
    iii. While listening to the normal breath sounds, also listen for evidence of any additional or abnormal sounds. The common adventitious sounds include wheezes, rhonchi, and crackles (formerly known as rales).
k. Inspection, palpation, and percussion of the anterior thorax
    i. Once you have completed auscultation of the posterior thorax, move to the front of the thorax to continue the cardiorespiratory assessment.
    ii. A good way to begin at the anterior thorax is to locate the heart's point of maximal impulse (PMI).

a) Place the palm of your hand flat over the left side of the patient's chest with the pads of your fingers across the midclavicular line at about the fifth or sixth intercostal space (ICS).

iii. Next, rotate your hand at the heel to palpate the precordium over the sternum, keeping your hand flat against the sternum.

iv. With careful palpation, you might be able to discern any pulsations or vibrations (thrills) associated with abnormal blood flow from stenotic vessels or aneurysms.

l. Auscultation of heart sounds

i. Following the determination of lung sounds, the emphasis is then auscultation of the heart sounds.

ii. Begin with auscultation of the aortic area at the second ICS to the right of the sternal border.

iii. Now, move your stethoscope across the sternum to the second ICS to the left of the sternal border to auscultate the pulmonic valve of S_2.

iv. If you move your stethoscope down to the third ICS, still on the left, you can also hear the pulmonic component of S_2 (Erb's point).

v. From the semilunar valves, you move to the atrioventricular valves, beginning with the tricuspid.

vi. The tricuspid region is located around the fourth ICS, just to the left of the sternum.

vii. The mitral area is located around the fifth ICS, along the midclavicular line.

viii. Auscultation of heart sounds takes considerable practice, a thorough understanding of normal and abnormal heart sounds, focused attention during auscultation, and a quiet environment.

m. Neck assessment

i. In the neck region, you can assess for the presence of bruits and evaluate the degree of jugular venous pressure.

ii. To assess for bruits, first have the patient turn his or her head away from the artery being examined and carefully palpate the carotid vessel for patency and thrills.

iii. Assessment of venous pressure can provide valuable information about the patient's blood volume, right heart failure, right atrial filling pressure, and pericardial pressure on the heart.

iv. When a metric ruler is placed vertically on the sternal angle, the point where the straightedge and the ruler intersect reveals the jugular venous pressure measurement.

n. Abdominal assessment

i. Another important assessment in the cardiorespiratory examination is the presence and status of abdominal ascites.

ii. One way of determining the source of abdominal distention is to assess for the presence of the wave of ascites.
iii. In patients with abdominal distention, measuring and recording abdominal girth is important.
iv. Abdominal girth is measured by determining the circumference of the abdomen at a specified point, usually the umbilicus.

o. Assessment of edema
i. The final assessment in the cardiorespiratory examination is the determination and quantification of edema and pitting edema.
ii. If the edema is pitting, you should determine the extent of pitting.

9. Neurologic assessment
a. A thorough neurologic assessment is especially beneficial for patients who have experienced cerebrovascular accident and those who are recovering from traumatic brain injury or neurosurgery.
b. Neurological assessments can:
i. Judge recovery
ii. Offer warning signs of impending neurologic events
c. Serial neurologic assessments of patients with dementia can be performed to evaluate progression of disease.
d. A thorough assessment should include components of the patient's:
i. Mental status: a general assessment of the patient's level of alertness and orientation
ii. Speech and language abilities: Assessing speech and language largely consists of scrutinizing the patient's articulation of words, word choices, rate of speech, volume of speech, continuity of thought, and ability to repeat back phrases.
iii. Cranial nerves: An abbreviated cranial nerve assessment can be conducted by the community paramedic, while a comprehensive cranial nerve assessment may be deferred to the primary care physician.
e. Begin with the second cranial nerve, the optic nerve, to conduct a gross assessment of visual acuity. This can be accomplished with a handheld visual acuity chart or with simple discretion of details for near and far objects.
f. The motor assessment of the fifth cranial nerve, the trigeminal nerve, involves having the patient clench the teeth while the community paramedic assesses the strength and symmetry of contraction of the masseter muscles bilaterally.
g. The trigeminal nerve sensory component can be easily tested with a light or dull touch to the lateral forehead, the zygomatic region, and the lateral chin on each side of the face.
h. The seventh cranial nerve, the facial nerve, is assessed by having the patient raise the eyebrows, squint both eyes closed tightly, and show the teeth.

i. The ninth (glossopharyngeal) and tenth (vagus) cranial nerves can be assessed together by having the patient open the mouth, stick out the tongue, and say "ahhh."

j. The eleventh cranial nerve, the spinal accessory nerve, is easily assessed by placing your hands on the patient's shoulders and having the patient shrug against the resistance.

k. Finally, assess the twelfth cranial nerve, the hypoglossal nerve, by asking the patient to protrude the tongue. Look for symmetry toward the midline.

l. Sensory and motor functions
    i. Assessment of the sensory and motor tracts may be necessary in some patients who have a history or other evidence of a neurologic disorder.
    ii. The discussion here focuses on three pathways:
        a) The corticospinal tract (a motor pathway)
        b) The spinothalamic tract
        c) The posterior column tract (both sensory pathways)
    iii. For the community paramedic, the key to this assessment is to compare motor function and types of sensory function from each side of the body.
    iv. Assessing the function of the corticospinal motor tract involves having the patient move an extremity or portion of the extremity upon command.

p. Tests of the patient's ability to perceive pain and temperature differences in the extremities, coupled with the other sensory and motor assessments, can provide important information about the patient's neurologic status.

q. The final sensory nerve tract to assess is the posterior column.
    i. The posterior column senses vibratory sensations and position sense (proprioception).
    ii. It also provides sensory information from pressure and fine touch stimulation—a point that can be utilized during the neurologic examination.
    iii. It is valuable to assess strength and coordination, and balance and position sense using the Romberg test.

r. Reflexes
    i. The final component of the neurologic assessment is the evaluation of the patient's deep tendon reflexes (DTRs).
    ii. DTRs can be useful in assessing a patient's neurologic status and, in some cases, electrolyte status.
    iii. To elicit a DTR, use a striking tool such as a reflex hammer.

s. The patellar tendon reflex is best accomplished with the patient sitting, the legs hanging dependent, and the knees flexed in a relaxed position. With a reflex hammer, strike the patellar tendon just below the patella with a brisk and deliberate tap.

t. When assessing for the biceps tendon response, locate the biceptal tendon by palpation.

i. Place your thumb firmly over the biceps tendon.
ii. Apply some pressure to create tension in the tendon.
iii. Strike your thumb briskly with the reflex hammer to stretch the tendon and elicit the response.

u. The brachioradialis reflex may be difficult to elicit.
i. With the patient's arm resting on his or her thigh and fully relaxed.
ii. Make sure the radius is facing upward.
iii. Strike the brachioradialis approximately 2 inches (5 cm) above the wrist.
iv. This should result in a small flexion of the forearm.

10. Abdominal assessment
a. Abdominal assessment begins with a careful inspection.
b. The assessment of the abdomen should be performed in the following order:
i. Inspection
ii. Auscultation
iii. Percussion
iv. Palpation
c. Inspection begins with observing the contour and symmetry of the abdomen, looking for scars, superficial vessels, discoloration, striations, any bulges (including an umbilical hernia), and the presence of any rashes or skin lesions.
d. Auscultation of the abdomen should be performed in all four quadrants using the diaphragm of the stethoscope.
e. The abdomen can be percussed using an indirect technique.
i. Percussing the abdomen enables you to differentiate between abdominal fluid, adipose tissue, and intraluminal gas.
ii. It can also help you define the borders of masses or other dense tissue such as the liver or spleen.
iii. If a posterior assessment of the abdomen is conducted, it should include percussion over the costovertebral angle.
f. Palpation of the abdomen should be the last examination technique employed and should begin in the region of the abdomen that is least symptomatic, if appropriate.
g. Palpation should consist of two approaches:
i. Light palpation
ii. Deep palpation
h. The abdominal reflex is elicited by lightly stroking the abdomen in all four quadrants, from the periphery toward the umbilicus, using a small blunt object like a cotton- tipped applicator or the handle end of the reflex hammer.

11. Musculoskeletal assessment
a. Assessment of the musculoskeletal system in community paramedicine is largely a determination of:

   i. Disease progression
   ii. Degree of injury recovery
b. In some instances, the goal may be to identify potential disease sources such as pulmonary emboli from thrombophlebitis in the leg.
c. The assessment generally consists of determining:
   i. Joint symmetry
   ii. Range of motion
   iii. Any deformities
   iv. The presence of edema, redness, and areas that are warm to touch
d. The musculoskeletal assessment should be systematic and include both inspection and palpation, including measuring passive range of motion of joints when indicated.
e. Inspection of the extremities should include a determination of symmetry of joints and long bones of each side.
f. When examining the hands, look for a lack of symmetry among digits, poor alignment, redness and warmth, and the presence of deformities or nodules on the distal phalangeal joints suggestive of arthritic changes.
g. Elbows and knees should be assessed for swelling and edema from bursitis and effusion of the synovial compartment.
h. Assessing a patient's range of motion generally necessitates ensuring the patient is in a proper position for assessing the joints (typically semi-Fowler's in bed).
   i. In active range of motion, the patient is asked to demonstrate the joint's full range of motion**.**
   ii. With passive range of motion, the patient's joint is moved through the entire range of motion by the examiner and the range is measured, usually with a goniometer.
i. Head-to-toe examination
   i. The inspection and palpation components should be integrated as each region of the body is systematically assessed.
   ii. The traditional approach is to begin at the head and progress toward the feet; however, the information gathered during the history taking should guide the physical assessment.
   iii. Examination of the head, if deemed necessary, includes inspection for symmetry and palpation for deformities, tenderness, crepitus, and joint and muscle function.
   iv. A cervical spine examination might include palpation for deformities, tenderness, muscle spasm, and malalignment.
   v. Upper extremity assessment of musculoskeletal structure and function involves inspection for symmetry and discoloration as well as palpation for tenderness, deformities, and neurovascular status.
   vi. Some simple assessments for range of motion also could be useful.

vii. Lower extremity assessments may begin early in the patient encounter, with simple observations of the patient's gait, ambulatory ease and mobility, and speed and agility of movement while walking and ascending stairs.

viii. Further lower extremity examination should include inspection for symmetry, discoloration, swelling, varicose veins, and lesions, as well as palpation for tenderness, crepitus, warmth to touch, tension to palpation, pitting edema, and neurovascular status.

ix. Rather than determining equality of strength, which is a traditional strength measurement in the prehospital environment, the community paramedic should focus on degree or magnitude of strength.

x. One common approach is to use the Medical Research Council (MRC) system of assessment.

IX. Documenting and Reporting

A. The information gathered by the community paramedic needs to be documented and recorded so that other health care providers can share it.

1. The format and style of documentation should be consistent among all health care providers within the system.
2. Most systems rely on documentation following the SOAP (subjective, objective, assessment, and plan) format, but follow local protocols.
3. For clarity and to prevent miscommunication:
   a. Use a standardized convention in medical documentation.
   b. Avoid or minimize abbreviations.
   c. Findings and treatments should be detailed with accuracy and clarity on the patient medical record.
   d. Follow local protocols and procedures.

Post-Lecture

Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (**date to be determined by instructor**).

B. Read Chapter 13, "Lab Values," for the next class session.

Chapter 13
Lab Values

Unit Summary

After students complete this chapter and the related course work, they will be able to explain the purpose of a complete blood count, identify the components and purpose of a basic metabolic profile, discuss the purpose of evaluating serum lactate and troponin levels, explain the purpose of a stool guaiac test, discuss the reasons to evaluate the hemoglobin A_{1C} in a patient with diabetes, and describe the components of liver function tests and venous blood gas analysis.

Objectives

1. Explain the purpose of a complete blood count, including hemoglobin and hematocrit. (p 211)
2. Identify the components and purpose of a basic metabolic profile, including concentrations of glucose, blood urea nitrogen, and creatinine; the electrolytes sodium, potassium, and chloride; and bicarbonate ion and carbon dioxide levels. (pp 211-216)
3. Explain the purpose of evaluating a serum lactate level. (p 217)
4. Explain the purpose of evaluating a troponin level. (p 217)
5. Explain the purpose of evaluating international normalized ratio values. (p 217)
6. Describe normal and abnormal findings in urine analysis. (pp 218-219)
7. Explain the purpose of a stool guaiac test. (pp 219-220)
8. Explain the purpose of evaluating the hemoglobin A_{1C} in a patient with diabetes. (pp 220-221)
9. Explain the purpose of serum lipid profiles. (pp 220-221)
10. Describe the components of liver function tests. (pp 221-222)
11. Describe the components and purpose of venous blood gas analysis. (pp 222-223)

Readings and Preparation

- Review all instructional materials including ***Community Health Paramedicine***, Chapter 13, and all related presentation support materials.
- Review local protocols relating to obtaining blood for a complete blood count and the components of the basic metabolic profile, obtaining and processing urine for urine

analysis, evaluating hemoglobin A_{1C} in a patient with diabetes, and performing venous blood gas analysis (VBG).

Support Materials

- Lecture PowerPoint presentation

Enhancements

- Direct students to visit Navigate 2.
- Provide copies of local protocols.

Unit Activities

Writing assignments: Instruct each student to put together a scenario for lab values.

Student presentations: Divide students into groups. Instruct each group to act out the lab values scenario (developed for the writing assignment) for the rest of the class.

Group activities: Discuss and critique each student presentation as a group. Discuss problems regarding the accuracy of tests, concentrations of metabolic profile components, the purposes of evaluating different element and protein levels in patients, and what different tests reveal.

Pre-Lecture

You are the Community Paramedic

"You are the Community Paramedic" is an opening case study that encourages critical thinking skills.

Instructor Directions

1. Direct students to read the "You are the Community Paramedic" scenario found a the beginning of Chapter 13.
2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question.
3. You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. Lab tests

1. The patient history and physical examination do not paint a complete picture of the patient's condition.
2. The primary care physician will order specific lab tests to be performed on the patient's:
   a. Blood
   b. Urine
3. Depending on local protocols, community paramedics may collect samples from the patient at home for testing in a lab.
4. Normal values of some labs may vary slightly based on:
   a. Location
   b. Hospital
   c. Lab
5. If there are any questions about a lab value, consult with your medical director.

II. Complete Blood Count

A. The value of CBC

1. The complete blood count (CBC), including hemoglobin and hematocrit, is valuable in determining any number of pathologies, such as:
   a. Anemia
   b. Bleeding
   c. The presence of infection
   d. Allergic reaction
   e. Bone marrow problems
2. The CBC measures:
   a. Red blood cells (RBCs or erythrocytes)
   b. Hemoglobin
   c. Hematocrit
   d. Platelets (thrombocytes)
   e. White blood cells (WBCs or lymphocytes)
3. RBCs are the formed elements in the blood that carry oxygen in the bloodstream.
   a. The normal range for RBC is 3.9 to 5.5 × 10^6/μL (microliter) of blood.
4. Hemoglobin (Hgb) is the protein on the RBC that carries oxygen to the cells and carbon dioxide away from the tissue.

   a. The normal hemoglobin range is 14 to 18 g/dL for males, and 12 to 16 g/dL for females.
5. Hematocrit is the percentage of RBCs compared to the entire volume of blood.
   a. Usually 45% to 52% for men and 37% to 48% for women
6. Platelets are colorless blood cells that circulate in the bloodstream to aid in clotting.
   a. The normal range is 150 to 350 × 10^3/μL.
7. WBCs are mobilized by the body to fight infection. When called into action for this purpose, WBCs are used up faster than they can be made.
   a. The normal range for WBC counts is between 4,500/μL and 11,000/μL.
8. If the test is ordered as a CBC with differential, each type of WBC will be counted.
9. Levels of specific WBCs can be used to help identify:
   a. Allergic reactions
   b. Immune reactions
   c. Infective processes
10. Types of WBCs included in the differential test:
   a. Neutrophils
   b. Bank cells
   c. T-type lymphocytes (T cells)
   d. B-type lymphocytes (B cells)
   e. Monocytes
   f. Eosinophils
   g. Basophils
11. In chronic disease processes, changes may occur in any of these elements.
   a. Example: RBCs, platelets, and WBCs are all made in the bone marrow. A CBC showing that all of these levels are low would suggest that the patient is experiencing a bone marrow disease process, or is receiving some type of treatment that is destroying bone marrow.
   b. Example: If a person is dehydrated he or she may have a completely normal RBC and hemoglobin, but the hematocrit will be elevated because the patient's blood is more concentrated from the dehydration.
12. Keep in mind that pathologies that show a general increase in the WBC count will require a CBC with differential to determine exactly which component is elevated.
   a. Such results could then be used to discern between an infection and an allergic reaction.

III. Basic Metabolic Profile

A. The basic metabolic profile (BMP) comprises a group of tests that provide information about the body's metabolic processes.

1. It is a blood test, like the CBC, but instead of looking at the formed elements in the blood, it examines other circulating components.
2. The BMP measures the concentrations of:
   a. Glucose
   b. Blood urea nitrogen (BUN)
   c. Creatinine (often used to calculate the glomerular filtration rate)
   d. The electrolytes sodium, potassium, and chloride
   e. Bicarbonate ion level
   f. Carbon dioxide level
3. The results are used to evaluate three aspects of the body's functioning:
   a. Blood glucose levels (for diabetes management)
   b. Kidney function (to ascertain renal insufficiency or failure)
   c. Blood acid−base balance (to assess hydration and respiratory status)

B. Glucose

1. Glucose is the most important carbohydrate in the body.
   a. Most readily usable form of sugar and energy
2. The normal range for a fasting glucose is 70 to 100 mg/dL. For nondiabetic patients, the upper range 2 hours after a meal would be below 140 mg/dL.
3. Most commonly, glucose tests are performed to aid in the management of patients with diabetes.
   a. Hypoglycemia: can lead to an acute altered level of consciousness and death
   b. Hyperglycemia: can lead to diabetic coma, metabolic acidosis, and severe dehydration
4. When assessing the patient with diabetes, a fasting glucose test is the most optimal.
   a. Best indicator of the patient's baseline as the body has utilized its glucose stores during the fasting period (typically 8 hours prior to the test)
5. The glucose test also has another benefit: it can indicate renal impairment.
   a. Patients with renal impairment are unable to clear the glucose effectively. A high glucose level in the blood but not in the urine could indicate renal insufficiency or failure.
6. The blood glucose test is a basic one that may be performed by community paramedics and can help in the monitoring and management of patients with chronic conditions.
   a. Unless otherwise indicated, the blood glucose devices used for point-of-care testing are designed for capillary sampling.

   b. The recommended procedure for obtaining a capillary sample calls for:
      i. Preparing the site (finger or heel) by wiping it with alcohol
      ii. Waiting for the site to dry
      iii. Making a single puncture in the skin
      iv. Discarding the first drop of blood (which may be contaminated)
      v. Obtaining the sample
7. Although the glucometer provides a quick check of the patient's blood glucose level, procedures that deviate from the preceding steps can yield inconsistent results.
   a. It is also recommended that the patient have a venous blood glucose test performed, evaluated, and reported by a lab for the most accurate results.

C. Blood urea nitrogen

1. Blood urea nitrogen (BUN) is a product of normal protein catabolism and has a normal range of 8 to 23 mg/dL.
2. In a patient with a chronic condition, an elevated BUN could mean the kidneys are no longer able to pull out the urea from the bloodstream.
3. When combined with the creatinine level, this information is very useful as an indicator of compromised renal function.
4. Elevated BUN levels may be caused by conditions other than renal dysfunction.
5. Other events besides increased protein ingestion may potentially lead to excessive amounts of protein in the body that need to be catabolized.
6. Elevated BUN can result from:
   a. Tissue damage incurred in trauma and burns
   b. Blood loss

D. Creatinine

1. Creatinine is a waste by-product of muscle breakdown and is eliminated through the kidneys.
2. Measurement of creatinine is one of the best routine lab tests for revealing information about renal function.
3. It is also used in the calculation of glomerular filtration rate.
4. The normal range for creatinine is 0.6 to 1.2 mg/dL, albeit with some variations depending on the lab performing the test and the patient's gender and age.
5. When an elevated creatinine level is combined with an elevated BUN value, it indicates that a patient is experiencing some sort of renal compromise.
6. The next step would be to review the glomerular filtration rate or have one run if it has not already been performed.

E. Glomerular filtration rate

1. To test how well the kidneys are actually filtering wastes and toxins from the blood, a glomerular filtration rate (GFR) or an estimated GFR (eGFR) should be ordered, if not already reported.

2. The GFR is the rate at which the kidneys can filter creatinine from the bloodstream. When functionally normally, the kidneys should be able to filter all of the creatinine out of 100 mL of blood every minute.
3. A simpler and less time-consuming method—the eGFR—can be used to calculate the GFR using tests that are already routinely performed and information that is readily available during a patient contact.
    a. To calculate the eGFR, the lab collects data on the:
        i. Age
        ii. Gender
        iii. Race (African or non-African)
        iv. Creatinine level
    b. This data is entered into a formula to estimate the GFR.

F. Electrolyte panel

1. Three electrolytes are evaluated in the BMP: sodium (Na^+), potassium (K^+), and chloride (Cl^-).
    a. Sodium is the predominant extracellular electrolyte and is important for nerve transmission and the cardiac cycle.
    b. Potassium is primarily found in the intracellular environment and plays a critical role in the cardiac cycle.
    c. Chloride is found in extracellular spaces and combines to neutralize cations (positively charged ion). It also binds to the sodium ion, forming the sodium chloride molecule.
2. The concentrations of the three major electrolytes—sodium, potassium, and chloride—change in different disease states.
3. Sodium
    a. The axiom "water follows sodium" suggests the kinds of "shift" that happen when the body uses sodium to manage its systemic fluid levels.
    b. The normal sodium range is 136 to 142 mEq/L.
    c. Hyponatremia (low sodium level) can be caused by:
        i. Overhydration
        ii. Excessive sodium loss (occurs in patients with congestive heart failure, renal failure, and liver disease, and patients receiving diuretic therapy)
    d. Hypernatremia (high sodium level)
        i. Can occur in patients with closed head injury as a result of the treatment for this trauma (3% NaCl [hypertonic saline solution])
        ii. Can also be caused by dehydration
4. Potassium
    a. The body can lose potassium in several ways, leading to hypokalemia.
        i. Gastrointestinal (GI) losses (eg, vomiting and diarrhea)
        ii. Intravascular stores of potassium can be shifted into the cells by insulin.

b. Potassium is a critical electrolyte in the cardiac cycle.
c. Potassium is measured in milliequivalents per liter (mEq/L); the normal level of potassium is 3.5 to 5.0 mEq/L.
d. Diuretic therapy often produces hypokalemia as a side effect, so patients taking diuretics may also be prescribed a potassium supplement to help manage their levels of this electrolyte.
e. Hyperkalemia is defined as a serum potassium concentration greater than 5 mEq/L.
    i. Moderate (6 to 7 mEq/L) and severe (>7 mEq/L) forms of hyperkalemia are life threatening and require immediate therapy.
f. Hyperkalemia can result from:
    i. Cellular lysis (occurs with crush and burn injuries)
    ii. Drug administration (angiotensin-converting enzyme [ACE] inhibitors)
    iii. Metabolic acidosis
    iv. Poor renal excretion
    v. Undergoing dialysis

5. Chloride
    a. Chloride is an anion, meaning it has a negative charge.
        i. It is often found combined with electrolytes that carry a positive charge (cations), such as sodium and potassium.
    b. Chloride is most often associated with sodium.
    c. The normal range for chloride is 96 to 106 mEq/L.
    d. Chloride concentrations may be low due to use of diuretic therapy, as such medication causes fluid losses by shifting sodium stores.
6. Bicarbonate and carbon dioxide
    a. Like chloride, bicarbonate (HCO_3^-) is an anion found in the blood.
    b. It is closely tied to carbon dioxide (CO_2) through the acid–base balance system.
    c. Bicarbonate acts as a buffer to metabolic acid.
        i. When bicarbonate and carbon dioxide are combined, they form carbonic acid, which disassociates into water and carbon dioxide and is exhaled as a waste product.
        ii. The more acidotic the system, the more bicarbonate is used to buffer the acid.
    d. Carbon dioxide is a respiratory acid.
        i. It is reported in millimeters of mercury (mm Hg) and indicates how much pressure the carbon dioxide is exerting in the atmosphere in the area being measured.
    e. The normal value of carbon dioxide is in the range of 35 to 45 mm Hg.
        i. A value greater than 45 mm Hg indicates the patient is respiratory acidosis.

ii. A value below 35 mm Hg indicates the patient is respiratory alkalosis.

f. Causes of metabolic acidosis:
   i. Sepsis
   ii. Dehydration

g. Causes of metabolic alkalosis:
   i. Rising bicarbonate concentrations
   ii. Renal dysfunction

IV. B-Type Natriuretic Peptide

A. Measurement of B-type natriuretic peptide

1. B-type natriuretic peptide (BNP), or brain natriuretic peptide, is measured to identify the presence and possibly the severity of congestive heart failure (CHF).
2. In a patient with CHF, as intracardiac pressure builds, the body needs a mechanism to relieve that excess pressure.
   a. One such mechanism is to reduce the intravascular fluid by increasing both sodium excretion and water excretion (diuresis).
   b. BNP inhibits sodium reuptake in the kidneys and increases the GFR.
   c. Elevated BNP levels indicate that the heart ventricles have experienced either excess fluid or excess pressure.
   d. BNP values are correlated with CHF as follows:
      i. Greater than normal but <200 pg/mL (picograms per milliliter): likely compensated CHF
      ii. ≥200 pg/mL to ≤400 pg/mL: likely moderate CHF
      iii. >400 pg/mL: likely moderate-to-severe CHF
3. When combined with other clinical presentations of either right- or left-sided heart failure, these are very telling lab values.

V. Serum Lactate Level

A. Lactic acid

1. Under normal conditions, the cells of the body get their energy from the citric acid cycle, where oxygen is the final recipient of the electron transport chain.
   a. When the cells of the body become hypoperfused, they may need to use anaerobic metabolism to create energy.
   b. The energy yield from this process is much less, only 2 ATP molecules, and one of its by-products is lactic acid, also known as lactate, at levels greater than normal (5.0 to 15 mg/dL).
   c. Some conditions increase oxygen demand and, at the same time, decrease blood flow to the body systems:
      i. Severe hypoxemia

ii. Hypovolemia
iii. Trauma
iv. Septic shock
v. Shivering
vi. Seizures

d. If the body cannot compensate for these changes, then lactic acid will build in the system, resulting in metabolic acidosis.
e. Most causes of increased lactate levels can be determined during the patient assessment.
    i. However, sepsis can be difficult to assess and often has a poor outcome.

VI. Troponin

A. Role of troponin

1. Troponin is a protein that plays a role in muscle contraction, including contraction of the muscles of the skeleton and heart.
    a. Troponin released into the serum only when a muscle undergoes cellular damage and necrosis, such as in a heart attack.
2. The normal range for this protein is 0 to 0.4 ng/mL, but specific subtypes are also measured.
    a. C, I, and T subunits
    b. Additional subunits found in troponin I specific to cardiac muscle
3. In a heart attack, cardiac troponin I (cTnI) is released.
    a. cTnI test for acute myocardial infarction
    b. At 6 hours after an acute myocardial infarction, the cTnI test is 97% sensitive and 95% specific for an acute myocardial infarction.

VII. International Normalized Ratio

A. Blood vessel injury

1. When a blood vessel is injured, this damage sets off a series of events that leads to clot formation and cessation of bleeding.
2. This cascade of events is first managed by the tissue factor (or extrinsic) pathway that involves thrombin; its effectiveness is measured using a lab value called prothrombin time (PT), which assesses the time it takes the blood to clot.
    a. The PT test is performed differently around the world with varying results.
    b. The international normalized ratio (INR) seeks to standardize these results so that treatment can be better planned.
    c. The normal range for the INR is 0.8 to 1.1.
3. Because the INR is essentially a measurement of the patient's clotting time, the higher the number, the longer it is taking the blood to clot.

a. When a patient is put on anticoagulant therapy, such as warfarin (Coumadin), the target for the INR is a range of 2.0 to 3.0.

VIII. Urine Analysis

A. Urine analysis, like the BMP, provides a wealth of information that can point to any number of pathologies and conditions, including:

1. Dehydration
2. Renal insufficiency
3. Diabetes
4. Drug ingestion

B. Color

1. The color of urine is often described as yellow, straw, pale, clear, and so on.
2. Absent any other constituent elements, this color is directly related to the concentration of the urine.
   a. The more concentrated the urine, and the darker its color, the less hydrated the patient.
   b. Reddish urine may be seen when there is blood in the urine.
   c. Brown or tea-colored urine is a sign of rhabdomyolysis.

C. Appearance

1. Another basic assessment of urine's appearance is the clarity of the urine.
2. Indicators of bladder infection:
   a. Turbidity
   b. Blood in the urine
   c. Changes in the WBC count from the CBC

D. Specific gravity

1. The specific gravity of the urine is a chemical property that describes its density relative to water.
2. The normal specific gravity of urine is 1.003 to 1.035.
   a. Distilled water has a specific gravity of 1.
3. The more concentrated the urine, the higher its specific gravity.

E. pH

1. When hydrogen ion (H^+) concentration increases, metabolic acidosis occurs.
   a. Serum pH levels will be lower than normal.
2. A decreased pH level can also be identified in urine in the setting of acidosis, although urine has a much broader normal range for pH: 4.5 to 8.

F. Glucose

1. In the healthy person, the normal range of glucose in the urine is 0 to 0.8 mmol/L.

2. Only when the serum glucose levels begin to rise does the body attempt to get rid of the excess glucose by eliminating it through the urine, such as in diabetes mellitus.
3. It is critical to look at the whole patient when assessing urinary glucose levels.

G. Ketones

1. As a paramedic, you are familiar with ketones in the context of diabetic emergencies—specifically, diabetic ketoacidosis (DKA), also known as diabetic coma.
   a. Body does not have enough insulin to meet the demands of its systems, resulting in inadequate cellular uptake of glucose and hyperglycemia
   b. Body attempts to rid itself of ketotic acids by eliminating them in the urine
2. Normally, no ketones are found in the urine, so their presence indicates ketones elsewhere in the body.
3. Ketones can also form through other metabolic processes, such as with alcoholic ketoacidosis or starvation ketoacidosis (like that seen in the Atkins diet regimen).

H. Protein

1. Most people excrete 40 to 80 mg of protein in their urine each day, but this is below the detectable threshold, so the normal value for protein in the urine is negative.
2. When protein is found in the urine, the causes can be organized into two categories:
   a. Renal
   b. Extrarenal
3. Any protein in the urine is a significant finding.

I. Blood and hemoglobin

1. Blood is not normally able to cross through the glomerular membrane and enter into the urine filtrate, so its presence is a significant indicator of either:
   a. Kidney damage
   b. Urinary tract damage
2. There are two aspects of blood assessed by the lab in urinalysis:
   a. RBCs
   b. Hemoglobin
3. RBCs in the urine, called hematuria, can indicate an issue with:
   a. The glomerular membrane (acts as a filter to prevent large particles from entering the urine)
   b. The urinary tract itself
4. RBCs in the urine can result from:
   a. Bladder infection
   b. Neoplasms

c. Kidney stones
d. Trauma
e. Placement of a urinary catheter

5. Hemoglobin in the urine (hemoglobinuria) most often means that there was traumatic passage of the RBCs through some part of the urinary system:
   a. The collecting ducts
   b. The urinary tract
   c. The bladder
6. Hemoglobin may also be found in the urine when some sort of hemolytic event occurs in the circulatory system and the kidneys filter its by-products.
   a. Hemolytic transfusion reaction
   b. Hemolytic anemia
   c. Rhabdomyolysis

J. Drugs

1. A variety of drugs can be detected in the urine.
2. This information can be helpful when evaluating a patient at home who may be experiencing any number of issues that are affected by prescription or nonprescription medications, or drugs of abuse.

IX. Stool Guaiac

A. Stool guaiac test

1. The stool guaiac test is a simple qualitative test that checks for occult blood in the stool.
   a. The sample can be collected at home or during a rectal exam at the physician's office.
2. The stool guaiac test is useful in determining a bleeding source within the GI tract. To determine a more definitive diagnosis, the test results need to be correlated with:
   a. The chief complaint
   b. A physical examination
   c. The other tests

X. Hemoglobin A_{1C}

A. Hemoglobin A_{1c} (HbA_{1c}) is a specific form of hemoglobin in the body that becomes glycated as a result of contact with glucose in the blood.

1. All people have glucose in their blood, so this glycated hemoglobin is a normal finding, with the level typically ranging between 4% and 5.6%.

2. The HbA_{1c} lab test reflects the average blood glucose over the last 2 to 3 months, rather than simply providing a snapshot of the glucose level as the glucometer does.
3. Results reveal the degree of control of the patient's diabetes over the previous several months.
4. The higher the HbA_{1c} value, the higher the risk of developing complications, such as:
   a. Cardiovascular disease
   b. Nephropathy
   c. Retinopathy
5. For people who have not been diagnosed with diabetes, the HbA_{1c} level can also indicate the risk or presence of diabetes.

XI. Serum Lipid Profile

A. Evaluating cardiovascular risk

1. The serum lipid profile is part of a standard physical examination screening with a primary care physician and evaluates the risk for cardiovascular disease, especially in patients:
   a. With preexisting diabetes
   b. Who smoke
   c. Who have a family history of arteriosclerotic vascular disease (ASVD)
2. This profile usually includes four components:
   a. Low-density lipoprotein (LDL)
   b. High-density lipoprotein (HDL)
   c. Triglycerides
   d. Total cholesterol
3. LDLs are the "bad" lipoproteins that increase the risk of cardiovascular disease; HDLs are the "good" lipoproteins, which decrease the amount of atherosclerosis in the walls of arteries.
4. An elevated value for LDL, triglycerides, or total cholesterol is indicative of an increased risk of heart disease.

XII. Liver Function Profile

A. Liver function tests (LFTs)

1. Commonly referred to as liver function tests, the liver function profile comprises a group of tests that assess how the liver is functioning.
2. Elevated LFT results are indicative of liver damage.
3. LFTs often include the following components:
   a. Albumin

b. Alkaline phosphatase (ALP)
c. Alanine transaminase (ALT)
d. Aspartate aminotransferase (AST)
e. Gamma-glutamyl transpeptidase (GGT)
f. Prothrombin time (PT)
g. Serum bilirubin

B. Albumin

1. By far the most common protein in the body
2. Albumin serves many functions:
   a. Acts as a transport protein (for free fatty acids, bilirubin, hormones, and drugs)
   b. Free-radical scavenger
   c. Serves as the main source (70%) of protein-generated osmotic pressure
3. This osmotic pressure allows colloids to move from one side of the cell membrane to the other as needed.
4. The normal range for albumin is 3.5 to 5.0 g/dL.
5. A low level of albumin may be due to:
   a. Increased catabolism (breakdown) of the protein (as seen in malnutrition)
   b. Decreased production
   c. Edema in the spaces between the cells in the tissue
6. Decreased production is seen in patients who have liver damage or other liver disease.
   a. Hypoalbuminemia (an abnormally low level of albumin) from increased interstitial sequestration can occur in high-vascular-permeability states and leads to diseases such as acute respiratory distress syndrome.
   b. High levels of albumin generally indicate only dehydration and are not pathologic.

C. Alkaline phosphatase

1. Alkaline phosphatase (ALP) is found in almost all body tissues; it is manufactured by the:
   a. Bone
   b. Liver
   c. Intestine
   d. Placenta
2. It is clinically useful for testing liver function and, in particular, for diagnosing a common bile duct obstruction.
3. The normal range is 30 to 120 U/L (units per liter).

D. Alanine transaminase

1. Alanine transaminase (ALT) (also called alanine aminotransferase [ALAT] and previously called SGPT) is found in large amounts in the:
   a. Liver
   b. Kidney
   c. Skeletal muscle
   d. Heart
2. Similar to the findings with AST, the normal range for ALT is 10 to 40 U/L, with low levels considered to be of no consequence.
3. Slightly more specific than the AST test for hepatic injury because fewer organs have ALT than have AST
4. The ratio of AST to ALT can also be an important diagnostic tool.
   a. A ratio of AST to ALT of 2:1 or greater is indicative of alcoholic liver disease, especially in the presence of elevated GGT.

E. Aspartate aminotransferase

1. The intracellular enzyme aspartate aminotransferase (previously called serum glutamic oxaloacetic transaminase or SGOT) is found in the:
   a. Liver (large amounts)
   b. Skeletal muscle
   c. Brain
   d. RBCs
   e. Heart
2. The normal range for this enzyme is 10 to 30 U/L.
3. Elevated levels are seen in liver damage, especially with acute conditions such as acute hepatitis or biliary tract obstruction.
4. Elevations in AST may occur in a setting of:
   a. Right heart failure
   b. Hypoxia (global or end-organ)
   c. Extensive trauma

F. Gamma-glutamyl transpeptidase

1. Another enzyme found in the liver, gamma-glutamyl transpeptidase (GGT), is most widely used to diagnose liver disease.
2. In addition to being associated with liver damage, elevated GGT levels are seen with diseases of the pancreas and biliary tract.
3. In addition to alcohol, use of certain drugs may cause GGT levels to rise:
   a. Barbiturates
   b. Phenytoin
   c. Nonsteroidal anti-inflammatory drugs
   d. Aspirin

4. The normal ranges for GGT are 2 to 30 U/L.
5. As with all laboratory tests, these values are evaluated in light of the entire patient assessment.

G. Total bilirubin

1. All RBCs are metabolized eventually, with bilirubin as one of the by-products of their breakdown.
2. This by-product is unconjugated and not water soluble (indirect bilirubin).
3. When bilirubin is conjugated in the liver, it becomes direct bilirubin, which is ultimately excreted in the bile.
4. The normal range for the total bilirubin level is 0.3 to 1.2 mg/dL.
5. Total bilirubin level (direct + indirect) is often elevated in patients with liver disease. Other causes of elevated levels of total bilirubin include:
   a. Biliary tract obstruction
   b. RBC hemolysis

H. Direct bilirubin

1. In the medical laboratory, bilirubin may be fractionated to indicate the respective levels of unconjugated (indirect) and conjugated (direct) bilirubin.
2. Although such tests are unreliable at times, the cause of elevated total bilirubin levels may be derived from the fractionated levels.
   a. The indirect bilirubin fraction is often elevated in conditions when massive hemolysis (as in massive blood transfusions or blood transfusion reactions) has occurred.
3. The normal values for direct and indirect bilirubin are 0.1 to 0.3 mg/dL and 0.2 to 0.9 mg/dL, respectively.

XIII. Venous Blood Gas Analysis

A. Respiratory status

1. Like its arterial cousin, venous blood gas (VBG) analysis helps to give insight into the respiratory status of patients experiencing emergencies that are:
   a. Respiratory
   b. Cardiac
   c. Diabetic
2. This test would be useful in managing patients with:
   a. Chronic obstructive pulmonary disease (COPD)
   b. Reactive airway disease (asthma)
   c. CHF
   d. Diabetes with glucose control issues (DKA)
3. In the noncritical patient, many of the values of the VBG correlate with the same items in the arterial blood gas (ABG) analysis.

B. Oximetry

1. There is an excellent correlation between the levels of carboxyhemoglobin and methemoglobin on a VBG and an ABG, but neither of these values is the same as the reading with the standard transdermal pulse oximeter.
2. For a quick assessment of oxygenation, the standard pulse oximeter will give a reasonable value.

C. Hydrogen ion (pH)

1. In noncritical patients, there is a reasonable correlation between the pH in the VBG and the ABG, although the venous pH is slightly more acidic.
   a. Add 0.035 to venous pH to estimate arterial pH
2. For patients with DKA, because their condition is not a primary respiratory issue, the pH can be used to guide the plan of care and monitor the patient's response to the plan of care.

D. Carbon dioxide

1. The carbon dioxide level may also be considered in the context of a VBG and respiratory distress.
   a. Example: In a patient with COPD, the presence of carbon dioxide retention is of interest.
2. The normal *arterial* range for carbon dioxide is 35 to 45 mm Hg. This may be higher when the patient is retaining carbon dioxide.

E. Bicarbonate

1. Arterial and venous bicarbonate levels are similar, so the VBG can be used to interpret the buffer system in the normal patient.
2. If the patient becomes hypoperfused, the VBG is no longer preferred and an ABG should be done instead.

XIV. Lab Values Summary

A. Normal and abnormal lab values

1. The table 13-12 in the book lists normal and abnormal lab values for adults.
2. This information can be helpful when discussing questions that the patient may have regarding lab results.

Post-Lecture

Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (**date to be determined by instructor**).

B. Read Chapter 14, "Plan of Care," for the next class session.

Chapter 14
Plan of Care

Unit Summary

After students complete this chapter and the related course work, they will be able to describe the role of the plan of care in ensuring integrated care, explain who crafts the plan of care and how the plan is modified, discuss the three types of intervention strategies in patient care, and explain how the Omaha system is used to create a plan of care. Additionally, they will be able to explain how the plan of care may be implemented by the community paramedic.

Objectives

1. Describe the role of the plan of care in ensuring integrated care. (pp 230-231)
2. Explain who crafts the plan of care. (pp 231-232)
3. Describe how the plan of care is modified. (p 232)
4. Describe the three types of intervention strategies in patient care. (p 233)
5. Explain how the Omaha system is used to create a plan of care. (pp 233-235)
6. Explain how the plan of care may be implemented by the community paramedic. (pp 235-237)

Readings and Preparation

- Review all instructional materials including ***Community Health Paramedicine***, Chapter 14, and all related presentation support materials.
- Review local protocols relating to the role of the plan of care and how it is modified, authoring the plan of care, the three types of intervention strategies in patient care, and how the plan of care may be implemented by the community paramedic.

Support Materials

- Lecture PowerPoint presentation

Enhancements

- Direct students to visit Navigate 2.
- Provide copies of local protocols.

Unit Activities

Writing assignments: Instruct each student to put together a scenario for a plan of care.

Student presentations: Divide students into groups. Instruct each group to act out the scenario for a plan of care (developed for the writing assignment) for the rest of the class.

Group activities: Discuss and critique each student presentation as a group. Discuss problems involved with the role of the plan of care, modifying the plan of care, the different types of intervention strategies in patient care, how the Omaha system is used to create a plan of care, and how the plan of care may be implemented by the community paramedic.

Pre-Lecture

You are the Community Paramedic

"You are the Community Paramedic" is an opening case study that encourages critical thinking skills.

Instructor Directions

1. Direct students to read the "You are the Community Paramedic" scenario found a the beginning of Chapter 14.
2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question.
3. You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. The plan of care

1. The plan of care is one tool that enables every member of the health care team to provide consistent patient care.
2. The plan of care is designed to establish a course of action for patient care, including defining patient care priorities, with the ultimate goal of bettering the patient's health.
3. The plan of care centers on:
   a. Education

   b. Disease and injury management
   c. Appropriate referrals to outreach services and health care providers
4. The role of the community paramedic is to implement the plan of care.

II. Plan of Care

A. Integrated care

1. In years past, caregivers from a variety of disciplines (eg, nursing, social work) created and followed their own individual plans of care in managing a patient.
2. Today it is recognized that integrated care is essential to ensure that patient care is delivered effectively, efficiently, and consistently.
3. In integrated care, health care providers work together by sharing:
   a. Patient information
   b. Plan of care
      i. Providers no longer rely on the patient to share vital information with each health care provider
4. A single plan of care is implemented by all of the health care providers for the patient so that everyone works in concert to achieve the desired patient outcomes.
5. The plan of care delineates specific care to be provided to the patient while allowing for timely revisions to the plan based on changes in the patient's status.
6. The plan of care outlines:
   a. Clinical assessments, treatments, and procedures
   b. Food plans
   c. Activity and exercise therapy
   d. Patient education
   e. Other activities necessary to improve the patient's health
7. The plan of care is a blueprint for the community paramedic to follow, providing:
   a. Direction for implementation
   b. A framework for evaluation of the patient's response to the designated actions
8. Expected outcomes are specific objectives that lead to the attainment of the goals written in the plan of care.
   a. Assist the community paramedic in evaluating progress toward a goal and in determining when a specific goal is met
   b. Provide direction for both patients' and providers' activities
   c. May also be used as criteria to evaluate the effectiveness of the plan of care
9. A plan of care should address two types of goals:
   a. Short term
      i. Should be achievable in a short time, usually a week or less.
   b. Long term

i. Expected to be achieved over a longer period, measured in weeks or months
ii. Most often used with chronic disease
iii. Focus on prevention, education, and mastery of self-management skills

10. Other types of goals:
    a. Patient-centered goals
        i. Reflect expected behavior and responses resulting from interventions
        ii. Example: "The patient will drink an 8-ounce glass of water three times a day."
    b. Observable goals
        i. Allow the community paramedic to observe and record change that is taking place
        ii. Observable changes may relate to physiology, knowledge, and behavior.
        iii. Example: "The patient will increase ambulation by five additional steps each day."
    c. Singular goals
        i. Provide an opportunity for more precise evaluation and response to an intervention
        ii. Singularity allows the community paramedic to determine whether specific expected outcomes have been achieved and assists in determining whether modifications in the plan of care are needed.
        iii. Example: "The patient's blood pressure will be less than 120/80 mm Hg by November 20."
11. Factors:
    a. Measurable factors
        i. Include goals and expected outcomes that provide a standard against which to measure actual outcomes
        ii. Measurable terms allow the community paramedic to objectively quantify changes in the patient's status.
        iii. Terms that specifically describe quality, quantity, frequency, and weight allow evaluation of the expected outcomes and determination of whether they have been achieved.
        iv. Example: "Blood glucose will remain under 115 mg/dL."
    b. Time-limited factors
        i. Indicate when the expected response should occur, assisting the community paramedic and the patient in determining whether timely progress is being made and expected outcomes have been reached.
        ii. On the predetermined date of evaluation, the community paramedic decides whether the expected outcome was achieved or whether a future evaluation date needs to be set because the expected outcome was not met.

B. Formatting a plan of care

1. The format of the plan of care may vary from one health care setting to another, whether hospital or clinic based, primary care, or fire department.
    a. Some plans of care take the form of charts and columns; others are narrative based.
2. The need to efficiently organize and share data throughout the entire span of the health care system has resulted in the publication of many standardized plans of care:
    a. Computerized forms
    b. Epic charting
    c. American Data's Electronic Chart System
3. Standardized plans of care enable the community paramedic to adhere to the requirements of the continuum of care while enabling the primary care physician to create an individualized plan of care for the patient.

C. Crafting a plan of care

1. Regardless of a patient's diagnosis, disease processes, and hospital admission status, every patient will have a plan of care created around his or her identified needs.
2. Typically, the plan of care is constructed by the patient's primary care physician or the medical director in accordance with local protocols.
3. Some patients enter the community paramedicine program through a referral from a hospital as part of a discharge plan.
4. Discharge planning: a plan detailing the patient's continuing care needs upon leaving the hospital
    a. Good discharge planning depends on:
        i. Comprehensive patient and family education
        ii. Safe and effective use of medication and medical equipment
        iii. Health-promoting food plans
        iv. Rehabilitation activities to maintain or regain independence
        v. Referrals to outreach services
        vi. Adherence to standards for personal hygiene and grooming.
5. The discharge planner, usually a nurse or social worker from the hospital or post-hospital care facility, coordinates a patient's discharge.
6. The patient's primary care physician signs off on the final discharge plan and is responsible for prescribing medications.

D. Modifying a plan of care

1. The community paramedic is an important player in the health care team huddle.
2. Ideally, the huddle should transpire on a biweekly or monthly basis to discuss the various patients enrolled in the community paramedicine program.
3. These meetings:

   a. Promote collaboration
   b. Ensure that each provider is informed of the patient's progress
   c. Allow for the identification of barriers in patient care
   d. Provide an outlet for determining solutions to barriers
4. An essential component of these regular meetings is the ongoing discussion of the patient's progress based on the plan of care.
5. During the huddle, the community paramedic reports the results of the patient assessments performed so that the plan of care can be modified by the medical director or the primary care physician based on the patient's status.
   a. Modifying the plan of care in the presence of the patient's entire health care team helps to ensure consistency of care.

III. Implementation of Care

A. Interventions

1. Implementation describes the actions initiated by the community paramedic to achieve the goals and expected outcomes of the plan of care.
2. An intervention is an action taken by the community paramedic to help the patient move from the present state of health to the health state described in the expected outcomes of the plan of care.
3. Intervention can be in the form of:
   a. Medication compliance
   b. Education
   c. Care for chronic disease
   d. Referrals to outreach services or health care providers
4. Community paramedics must always follow diagnostic and treatment protocols of the community paramedicine program.
   a. Protocols define what the community paramedic is permitted to treat and the types of treatment the community paramedic is permitted to administer.
5. Standing orders (also referred to as an order set) are orders specific to a patient and a condition.
   a. Standing orders are used to:
      i. Direct immediate care following the patient assessment and identification of a specific need
      ii. Select and administer interventions
6. Standing orders are also written by the medical director of the community paramedicine program.
7. With the use of protocols and standing orders, the community paramedic must use sound judgment in determining whether the intervention is correct and appropriate.
8. Contact the medical director if there are any questions about an intervention.

IV. Selecting Interventions

A. Types of interventions

1. The community paramedic determines the interventions to apply based on the goals and expected outcomes of the plan of care.
2. There are three types of interventions:
   a. Physician initiated
   b. Collaborative initiated
   c. Community paramedic initiated
3. Physician-initiated interventions are:
   a. Based on the patient's medical diagnosis and noted in the plan of care
   b. Carried out by the community paramedic, nurses, and other health care providers according to their scope of practice
4. Collaborative interventions require the knowledge, skill, and expertise of multiple health care professionals.
   a. Example: A recent stroke added to existing comorbidities of dementia and diabetes in a patient will require the coordination and collaboration of interventions from multiple health care providers, all focused on maintaining the patient's present level of health.
   b. The patient would require:
      i. Physical therapy
      ii. Occupational therapy
      iii. Medication reconciliation, as provided by a home health agency
5. Depending on the scope of the community paramedicine program, the community paramedic may collaborate with the case manager to ensure that:
   a. The appropriate home health referral was made
   b. The home-based services are implemented
   c. Any barriers the patient may experience in accessing care are addressed
6. Community paramedic-initiated interventions are interventions that the community paramedic determines are necessary to accomplish the goals and expected outcomes of the plan of care.
   a. These interventions must fall within the scope of practice of the community paramedic and the community paramedicine program.
   b. Interventions pertaining to monitoring, management, and education may be within the scope of practice of the community paramedicine program.
   c. Always check and follow local protocols.

V. The Omaha System

A. Overview and example

1. The Omaha system is a research-based, comprehensive practice and documentation standardized taxonomy designed to describe patient care.
2. The system includes three relational, reliable, and valid components, to be used together:
   a. Problems
   b. Interventions
   c. Outcomes

B. Organization of plans of care

1. In the Omaha system, plans of care are generally organized by major body system, in alphabetical order, and follow a logical progression:
   a. *Introductory paragraph.* A description of the patient's condition, the reason for reaching this conclusion, and the goal for patient care
   b. *Patient diagnosis.* A diagnosis of the patient's illnesses or injuries
   c. *Defining characteristics.* Signs and symptoms, specific problems, related risk factors, and observations
   d. *Expected outcome*. Short-term and long-term goals that are expected to help improve the patient's condition
   e. *Goals*. A statement of care goals, including a time frame to serve as a guide for determining what is realistic and workable for the patient
   f. *Interventions.*
      i. Community paramedic and health care team interventions: primarily oriented toward patient assessment, performing interventions within the provider's scope of practice, and patient education
      ii. Patient/family/caretaker interventions: actions to be performed after receiving instruction on how to perform the required interventions by a health care provider (eg, using an inhaler to control asthma)
   g. *Time frames for implementation*. An estimate of when services will occur and goals will be met; should be flexible enough to accommodate changes in the patient's needs, local protocols, and any standing orders
   h. *Referrals*. A description of referrals for services, including services to be utilized once the patient graduates from the community paramedicine program or another health care provider's scheduled services, such as a visiting nurse

C. Sample plan of care

1. The example presented here illustrates how the Omaha system is used by a medical director or primary care physician in crafting a plan of care. To craft a plan of care, the physician does the following:
   a. Reviews the patient documentation
   b. Reviews the patient's history

c. Performs a patient interview and assessment
d. Reviews the patient's diagnosis
e. Reviews the patient's existing care plans
f. Selects a care plan
g. Reviews the patient's diagnosis and how the diagnosis will impact the patient's condition and the care of the patient or the individualization of etiologies
h. Identifies the expected outcomes
i. Customizes interventions based on the patient's needs or the individualization of actions

2. Sharon is a 55-year-old woman who was hospitalized with terminal-stage pancreatic cancer.
   a. Step 1: Review of Documentation
      i. Sharon is a 55-year-old single woman.
      ii. Her diagnosis is stage IV pancreatic cancer.
      iii. She is receiving 5 mg of morphine sulfate every 4 hours, oxygen, and Lasix for reduction of fluid retention.
   b. Step 2: Review of Patient History
      i. Sharon developed pancreatic cancer 3 years ago and experienced a recurrence 6 months ago. She has just completed chemotherapeutic drug treatment.
      ii. She has developed fluid retention in her lung fields that requires repetitive draining.
      iii. The priority goal of care is to keep her comfortable.
   c. Step 3: Patient Interview and Assessment
      i. The interview and assessment reveal that Sharon has diminished breath sounds in the lung bases, shallow respirations of 24 breaths/min, and crackles or rales in both lungs. She is alert, oriented, and able to move all extremities. She complains of exhaustion and generalized pain.
   d. Step 4: Review of Patient Diagnosis
   e. Step 5: Review of Existing Care Plans
      i. Care will be provided for pancreatic cancer and immobility and the patient will receive hospice care.
   f. Step 6: Selection of Care Plan
      i. With stage IV pancreatic cancer, the patient may experience ineffective breathing patterns, pain, grieving, and the risk for infection and constipation.
      ii. All should be addressed within the plan of care, but for clarity, this example focuses only on the risk of constipation.
   g. Step 7: Individualization of Etiologies
      i. Risk of constipation: Individualized

a) Diminished defecation: Lack of mobility, lack of privacy, increased time spent in the semi-Fowler position, and reluctance to use a bedpan
b) Muscle weakness: Abdominal muscle weakness resulting from her decreased mobility
c) Decreased gastrointestinal motility due to decreased food and fluid intake, decreased activity, and increased anxiety

h. Step 8: Expected Outcomes
i. The plan of care author identifies the outcomes expected for the patient if the care plan is followed.
ii. Outcomes: individualized. Patient will not experience constipation as evidenced by the following:
a) Passage of soft, formed stool at least every other day
b) Absence of abdominal pain and distention; no feelings of fullness or pressure
c) No straining during defecation
d) Ability to maintain a bowel routine and optimal comfort

i. Step 9: Individualization of Actions
i. The author modifies the standard interventions to meet the needs of this patient and facilitate the expected outcomes.
ii. Actions: individualized
a) Assess Sharon every visit for signs and symptoms of constipation. Watch for pain, distention and feeling of fullness or pressure, straining, and absence of bowel movements for 3 or more days.
b) Assess bowel sounds. Remain alert for any decrease or change.
c) Prevent constipation:
1) Encourage attempts with urges.
2) Position appropriately with use of bedpan.
3) Provide privacy.
4) Offer music for relaxation.
5) Encourage intake of high-fiber foods.
6) Develop a plan for increased fluid intake.
7) Recommend warm liquids in the morning to stimulate peristalsis.
8) Monitor analgesic use, yet ensure pain management.
9) Request milk of magnesia or other laxatives as needed.
10) Report signs and symptoms of change to appropriate medical direction.

3. Sample summary
a. To implement this plan of care, the community paramedic will perform frequent assessments in the home and work collaboratively with family and other health care providers to ensure Sharon does not develop constipation.

b. The desired outcome is accomplished through:
    i. Ongoing education regarding prevention
    ii. Encouraging behaviors that promote gastrointestinal mobility
    iii. Remaining attentive to the patient's needs and concerns
    iv. Collaborating with other health care providers at the first symptom of constipation to circumvent any complications
c. As with any plan of care, the focus remains on prevention and the promotion of well-being in the patient.

VI. Sample: Implementing a Plan of Care

A. Implementing a plan of care for James

1. James Clark is a 58-year-old executive, husband, and father of three young women in their early twenties.
    a. He is recovering from a severe myocardial infarction and cardiac arrest.
    b. He has a history of posttraumatic stress disorder with depression, following a lengthy time spent in active combat during his military service.
2. The primary care physician assesses James and starts to formulate a patient-centered plan of care.
3. To implement this plan of care, the community paramedic will:
    a. Perform frequent in-home visits and patient assessments, providing the patient with comfort and support
    b. Implement initiatives, including identifying appropriate outreach services in order for the patient to recover and begin self-management
4. The community paramedic should be aware of and attentive to subtle changes in the patient's:
    a. Vital signs
    b. Eating habits
    c. Activity level
    d. Sleeping patterns
    e. These subtle changes may be signs of depression or anxiety.
5. The community paramedic should communicate any findings to the medical director or the health care team during a huddle to ensure the patient obtains the referrals to the proper health care and mental health resources.

Post-Lecture

Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (**date to be determined by instructor**).

B. Read Chapter 15, "Chronic Disease Management," for the next class session.

Chapter 15
Chronic Disease Management

Unit Summary

After students complete this chapter and the related course work, they will be able to define chronic disease, describe the role of the community paramedic in promoting self-management in the patient, and describe the monitoring, management, and education roles of the community paramedic in a variety of chronic diseases and conditions, such as coronary artery disease, hypertension, asthma, chronic constipation, dysuria, rheumatoid arthritis, amyotrophic lateral sclerosis, seizures, and sickle cell disease. Additionally, the students will be able to identify types of medical technology used in the home setting, and describe the monitoring, management, and education roles of the community paramedic for wound care and for specific types of durable medical equipment.

Objectives

1. Define chronic disease. (p 240)
2. Describe the role of the community paramedic in promoting self-management in the patient. (pp 240-241)
3. Describe the monitoring, management, and education roles of the community paramedic for coronary artery disease. (p 242)
4. Describe the monitoring, management, and education roles of the community paramedic for congestive heart failure. (pp 242-243)
5. Describe the monitoring, management, and education roles of the community paramedic for hypertension. (pp 243-244)
6. Describe the monitoring, management, and education roles of the community paramedic for asthma. (pp 244-246)
7. Describe the monitoring, management, and education roles of the community paramedic for chronic obstructive pulmonary disease. (pp 246-247)
8. Describe the monitoring, management, and education roles of the community paramedic for chronic constipation. (pp 247-248)
9. Describe the monitoring, management, and education roles of the community paramedic for chronic diarrhea. (pp 248-249)
10. Describe the monitoring, management, and education roles of the community paramedic for dysuria. (pp 249-250)
11. Describe the monitoring, management, and education roles of the community paramedic for kidney disease. (pp 250-252)

12. Describe the monitoring, management, and education roles of the community paramedic for osteoarthritis. (p 253)
13. Describe the monitoring, management, and education roles of the community paramedic for rheumatoid arthritis. (pp 253-254)
14. Describe the monitoring, management, and education roles of the community paramedic for wound care. (pp 254-257)
15. Describe the monitoring, management, and education roles of the community paramedic for cognitive decline or impairment. (pp 257-258)
16. Describe the monitoring, management, and education roles of the community paramedic for Alzheimer disease. (pp 258-259)
17. Describe the monitoring, management, and education roles of the community paramedic for Parkinson disease. (pp 259-260)
18. Describe the monitoring, management, and education roles of the community paramedic for amyotrophic laterial sclerosis. (p 260)
19. Describe the monitoring, management, and education roles of the community paramedic for Huntington disease. (pp 260-261)
20. Describe the monitoring, management, and education roles of the community paramedic for multiple sclerosis. (pp 261-262)
21. Describe the monitoring, management, and education roles of the community paramedic for chronic seizures. (pp 262-263)
22. Describe the monitoring, management, and education roles of the community paramedic for chronic pain. (pp 263-264)
23. Describe the monitoring, management, and education roles of the community paramedic for diabetes. (pp 264-266)
24. Describe the monitoring, management, and education roles of the community paramedic for sickle cell disease. (pp 266-267)
25. Describe the monitoring, management, and education roles of the community paramedic for hepatitis C. (pp 267-268)
26. Describe the monitoring, management, and education roles of the community paramedic for obesity. (pp 268-269)
27. Describe the monitoring, management, and education roles of the community paramedic for specific types of durable medical equipment. (pp 269-278)

Readings and Preparation

- Review all instructional materials including ***Community Health Paramedicine***, Chapter 15, and all related presentation support materials.
- Review local protocols relating to the monitoring, management, and education roles of the community paramedic for a variety of chronic diseases and conditions, such as cognitive decline/impairment, Parkinson disease, multiple sclerosis, and diabetes. Review protocols relating to the monitoring, management, and education of the community paramedic for wound care and for chronic pain.

Support Materials

- Lecture PowerPoint presentation

Enhancements

- Direct students to visit Navigate 2.
- Provide copies of local protocols.

Unit Activities

Writing assignments: Instruct each student to put together a scenario for chronic disease management.

Student presentations: Divide students into groups. Instruct each group to act out the scenario for chronic disease management (developed for the writing assignment) for the rest of the class.

Group activities: Discuss and critique each student presentation as a group. Discuss problems regarding managing chronic disease and the monitoring, management, and education roles of the community paramedic for a variety of chronic diseases and conditions. Discuss the elements of wound care, caring for a patient in chronic pain, and specific types of durable medical equipment.

Pre-Lecture

You are the Community Paramedic

"You are the Community Paramedic" is an opening case study that encourages critical thinking skills.

Instructor Directions

1. Direct students to read the "You are the Community Paramedic" scenario found a the beginning of Chapter 15.
2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question.
3. You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. Chronic disease

1. A chronic disease is a medical or psychological condition that occurs or is recurrent for more than 3 to 6 months.
2. Acute conditions come on abruptly and end quickly, with the end result being either recovery or death; chronic conditions continue indefinitely.
   a. Chronic conditions
      i. May not be "curable" (ie, treated to the point that they completely disappear)
      ii. Are managed over time
   b. Examples: osteoarthritis, depression, diabetes, chronic obstructive pulmonary disease, asthma, and heart failure
3. A diagnosis of chronic disease may affect the physical, psychological, spiritual, and economic aspects of a person's life.
   a. Change in quality of life
   b. May cause stress and anxiety
4. Community paramedics must be ready to:
   a. Assess, monitor, and manage the patient to determine if progress is being made or if the chronic disease is causing a decline in the patient's health
   b. Navigate the patient to outreach services and provide support to the patient, caregivers, or family based on the patient's condition
5. The goal of the community paramedic in caring for patients with chronic disease is to promote self-management.
6. Self-management of a chronic disease:
   a. Combines the elements and behaviors of patient self-care with the management of the disease

   b. Encourages the patient and family to be active agents in managing the patient's illnesses
7. The community paramedic needs to understand and promote the idea that the patient will become an expert in managing the disease process and the life changes it requires.

II. Self-Management

A. Elements of self-management

1. Self-management:
   a. Emphasizes the patient's involvement in his or her own health management and the problems associated with it
   b. Can be defined as a person's ability to understand, define, and appropriately act upon the symptoms that a disease may present
2. It requires that the patient or family be willing and able to provide the care needed for the chronic disease:
   a. Physically
   b. Intellectually
   c. Financially
   d. Emotionally
3. Patient incentives for self-management include:
   a. Autonomy (remaining at home with loved ones)
   b. Self-determination (remaining informed and active in health care choices and decisions)
4. Due to the pressures on hospitals to focus on acute care, the length of hospital stays continues to decrease, with the responsibility for chronic health care being shifted to the patient and his or her social network at home.
5. The ultimate goal of chronic disease self-management is an improved condition for the patient.
6. Key measures of effective self-management:
   a. Outcomes of improved health
   b. Prevention of complications of chronic illness
   c. Prevention of worsening conditions
7. Self-management is achieved when the patient can effectively:
   a. Self-monitor
   b. Organize medications
   c. Communicate with health care providers
   d. Understand his or her disease
8. The community paramedic can assist in this process by:
   a. Providing education

b. Acting as a navigator to outreach resources
c. Developing a better communication process between the patient's providers
d. Monitoring patient progress
e. Communicating when the patient's condition no longer meets the plan of care

B. Self-monitoring

1. For self-management to be successful, the community paramedic must:
   a. Support patients by providing them with educational resources
   b. Promoting their understanding of self-regulation and self-efficacy
2. Self-regulation is the patient's understanding of and respect for his or her own limitations.
3. Self-efficacy is the patient's belief in his or her own ability to accomplish or succeed in a specific task.
4. The patient who succeeds at self-management will require:
   a. Social support
   b. Motivation
   c. Ability to self-monitor

C. Medication inventory

1. Another key aspect of self-management is the patient's ability to inventory and confirm use of the correct medications.
2. Community paramedic's medication-related responsibilities may include assisting the patient with:
   a. Record keeping
   b. Compliance
   c. Associated self-monitoring (eg, blood glucose readings, vital signs, weight, pain scores, dietary intakes, and sleep logs)
3. Self-management of medications can be complex, given that a patient with a chronic disease is likely to be taking:
   a. Multiple prescriptions
   b. Herbal remedies
   c. Over-the-counter (OTC) medications
4. The community paramedic's role in supporting a patient's self-management of medications will occur in collaboration with the patient's health care team, including the patient's primary care physician.

D. Motivating patients

1. In addition to the medical interventions involved in the treatment and care of patients with a chronic disease, it is important to consider intervening using:
   a. Patient education
   b. Motivational coaching techniques
   c. Emotional support

d. Outside resources
e. Appropriate nutritional education

2. Tailoring the interactions to the patient will play a critical role in the patient's long-term success in managing the chronic ailment.
   a. A patient-centered outcome needs to be the center of all interventions and treatments provided.

III. Management of Specific Chronic Diseases

A. Specific chronic diseases

1. Understanding each disease is crucial to success if a community paramedic is to:
   a. Effectively treat the patient's condition (monitor)
   b. Educate the patient
   c. Manage the patient's individual needs
2. Monitoring and management practices will reflect:
   a. The scope of practice of each community paramedicine program
   b. The local protocols developed by the program's medical director
      i. Always follow local protocols.

IV. Common Cardiovascular Conditions

A. Coronary artery disease

1. Coronary artery disease (CAD) is an inflammatory or metabolic disease of the cardiac vasculature in which atherosclerotic plaque builds up in, and ultimately narrows, the coronary blood vessels.
   a. Narrowing of the vasculature
   b. Pain such as angina
   c. Acute myocardial event possible
2. Monitoring
   a. When a cardiovascular condition is present or suspected:
      i. Perform a thorough history and physical assessment
      ii. Use guidelines such as OPQRST (onset, provocation/palliation, quality, region/radiation, severity, timing)
   b. Common symptoms of CAD include:
      i. Dyspnea on exertion
      ii. Chest pain or shortness of breath at rest
      iii. Jaw pain
      iv. Intermittent nausea
   c. During the physical assessment, evaluate the patient for:
      i. Bruits

ii. Murmurs
iii. Third heart sounds
iv. Basilar rales
v. Peripheral edema
vi. Jugular vein distention

d. Obtain a 12-lead electrocardiogram (ECG) as part of the baseline assessment and anytime the patient experiences symptoms or events that could be considered cardiac related.
e. Document the patient's most recent serum lipid profile, or at least the last date it was performed.
   i. Remind physician to order updated serum lipid profile or evaluate the efficacy of medications

3. Management
   a. The primary goals when managing CAD are to:
      i. Identify the risk of unstable angina or an acute myocardial infarction
      ii. Improve the quality of overall functional capacity limiting the patient's capabilities
   b. The treatment modalities for CAD include:
      i. Smoking cessation
      ii. Lifestyle changes
      iii. Dietary habit changes
      iv. Medication management
      v. Potential surgical/intervention procedures (ie, placement of stents and removal of the plaque)
   c. The community paramedic should determine the patient's specific dietary needs from the plan of care.
   d. Medications used to manage CAD include:
      i. Antiplatelet agents
      ii. β-blockers (beta-blockers)
      iii. Lipid-lowering agents
      iv. Angiotensin-converting enzyme (ACE) inhibitors
   e. Long-term monitoring of these patients should focus on:
      i. Documenting compliance with the treatment regimen
      ii. Vital signs
      iii. Changes in overall symptoms and ability to carry out activities of daily living (ADLs)
   f. Obtain a baseline ECG during the enrollment visit for all patients who have a known diagnosis of cardiovascular disease and a secondary one for those exhibiting symptoms.
   g. Follow local protocols.

4. Education
    a. Education related to CAD should focus on the generalized definition and causes of this disease, such as:
        i. Poor dietary habits
        ii. Sedentary lifestyle
        iii. Undesirable cholesterol levels
    b. If the patient's health literacy level is high, discuss how the body processes fatty deposits, plaque buildup, and laboratory tests such as a full serum lipid profile.

B. Congestive heart failure

1. Congestive heart failure (CHF) is a cardiac condition in which the ventricles are unable to pump effectively enough to maintain adequate circulation to the rest of the body.
    a. According to the American Heart Association (AHA), more than 650,000 cases of CHF are diagnosed in the United States each year.
    b. CHF can occur secondary to either systolic, diastolic, or right-sided heart dysfunction.
    c. CHF is very complex and affects multiple organ systems.
    d. Risk factors for this condition include diabetes, hypertension, metabolic syndromes, atherosclerotic disease, obesity, myocardial infarction, and viral infections.
    e. To establish a diagnosis of CHF, the patient's primary care physician assesses the patient's risk and symptoms, and performs diagnostic tests.
        i. Two-dimensional echocardiogram
        ii. Measurement of B-type natriuretic peptide
        iii. Comprehensive metabolic panel
2. The American College of Cardiology Foundation has established four stages of CHF:
    a. *Stage A.* At high risk for heart failure but without structural heart disease or symptoms of heart failure
    b. *Stage B*. Structural heart disease but without signs or symptoms of heart failure
    c. *Stage C*. Structural heart disease with prior or current symptoms of heart failure
    d. *Stage D*. Refractory heart failure requiring specialized interventions
3. Once the patient's primary care physician has established the patient's stage, the patient's condition is then classified according to the New York Heart Association's functional capacity guidelines (Classes I, II, III, and IV).
4. The community paramedic should document the classification during:
    a. The enrollment and end-of-care visits to evaluate the efficacy of the treatments provided

   b. At each visit to determine whether there are differences in symptoms or exacerbation with physical activity
5. Monitoring and management
   a. To help manage patients, the primary manager of the patient's condition is established before the patient is enrolled in the community paramedicine program.
6. In the early stages of CHF, the primary care physician may treat the patient; in the later stages, a cardiologist and a nephrologist may control all aspects of treatment.
7. Once you have confirmed the primary manager with the medical director, evaluate the treatment goals designated by that physician per the plan of care.
8. Considerations include:
   a. What is the goal "dry" or optimal weight for this patient?
   b. Is there a diuresis protocol that the community paramedic should follow?
   c. Are there any dietary and fluid restrictions that the patient must adhere to?
   d. Has the physician established a "threshold of exacerbation" weight?
9. The threshold of exacerbation is the weight level at which a patient begins to have symptoms of exacerbation.
   a. Some patients with CHF have their symptoms worsen when they gain 2 to 3 pounds; others can gain 20 pounds before they experience exacerbation.
   b. Once you confirm the dry or optimal weight per the plan of care, you will be able to evaluate the threshold of exacerbation.
10. Medications that are commonly prescribed for systolic heart failure include:
    a. ACE inhibitors
    b. Angiotensin receptor blockers (ARBs) for those patients who cannot tolerate ACE inhibitors
    c. β-blockers
    d. Diuretics
    e. Digitalis glycosides for patients with atrial fibrillation
11. Education
    a. Patient education related to CHF is essential for a patient to manage his or her symptoms.
    b. Many resources to increase understanding of this disease are found online from the AHA and at local hospitals.
    c. Stoplight action plan uses traffic lights as a metaphor to classify symptoms as red, yellow, or green.
       i. Patients evaluate if it is time to call their primary care physicians if the patient is in the yellow zone to prevent symptoms from progressing to red zone (worsened dyspnea, edema, or weight gain).

C. Hypertension

1. Hypertension is defined as a chronic:

   a. Systolic blood pressure greater than 140 mm Hg
   b. Diastolic pressure greater than 90 mm Hg
2. Hypertension may stem from:
   a. Cardiovascular disease
   b. Renal disease
   c. Hepatic disease
   d. Neurologic disease
   e. Secondary to a genetic or structural abnormality
3. According to the AHA, almost 80 million people (1 out of every 3) in the United States had hypertension in 2015.
4. Appropriate blood pressure monitoring is done:
   a. When the patient has been at rest for 5 minutes in a seated position
   b. Using an appropriately sized cuff; either a manual or an automatic cuff
      i. Automatic blood pressure devices found at local stores may not be accurate.
5. Hypertension affects all the organs and systems throughout the body.
   a. Elevated blood pressure can cause damage to organs and blood vessels.
6. Monitoring
   a. During each visit with the patient, it is important to obtain a full set of vital signs.
   b. Blood pressure monitoring must be performed, with measurements taken on both arms during each visit.
   c. Document findings in medical record or patient binder; look for trends.
   d. If you notice a change, contact the medical director to determine the patient's next steps.
   e. The patient's primary care physician will be treating this condition, but sometimes the cardiologist may manage all of the patient's cardiac care.
7. Management
   a. To help manage patients with hypertension, you should follow the patient's plan of care and ensure compliance with:
      i. Medications
      ii. Diet
      iii. Exercise plans
   b. Standard management of hypertension includes lifestyle modifications and antihypertensive medications.
8. A wide variety of antihypertensive medications are available, and patients may be on either single or combination therapies.
9. Common medication classes used to treat hypertension include:
   a. ACE inhibitors
   b. Calcium-channel blockers

c. Thiazide diuretics
d. ARBs
e. β-blockers
f. Loop diuretics
g. Aldosterone antagonists
h. α_1-blockers
i. Centrally acting agents
j. Direct vasodilators
k. Postganglionic neural inhibitors
l. Direct renin inhibitors

10. Education
    a. Education should focus first on dietary changes, exercise, and reduction in alcohol consumption.
    b. Help the patient learn how to take blood pressure readings.
    c. Patients also need to understand what their goal blood pressure is, as determined by their primary care physicians.

V. Common Respiratory Conditions

A. Asthma

1. Asthma is defined as a chronic inflammatory process involving the lower airways and associated with excessive mucus production and swelling of the bronchioles.
2. It is causally associated with to an increase in reactivity (hyper-reactivity), which variably:
    a. Reduces the size of the airway
    b. Limits airflow to the bronchioles
3. To limit their complications, which could sometimes have fatal outcomes, patients must adhere to the guidelines established by their plan of care, such as:
    a. Eliminating allergens
    b. Maintaining medication compliance
    c. Reducing exacerbating factors
4. According to the Centers for Disease Control and Prevention (CDC), more than 18.7 million US adults had diagnosed asthma in 2010, 7 million of whom were children.
    a. From 2001 to 2010, there was a steady increase in:
        i. The number of patients diagnosed
        ii. The number of primary care visits
        iii. The number of emergency department visits and hospitalizations secondary to an asthma diagnosis or exacerbation.

   b. The number of asthma-related deaths declined 3.3% every year in the United States over the same 10-year period thanks to:
      i. Increased knowledge about asthma
      ii. Better medications
      iii. Overall management in the primary care setting
   c. The CDC has also identified predictors of death, such as:
      i. Overuse of β-agonists
      ii. Multiple hospitalizations
      iii. Intubation secondary to asthma
      iv. Lack of (or lack of adherence to) a plan of care
      v. Presence of comorbidities such as cardiovascular disease
5. Asthma is diagnosed through a combination of history and physical findings.
6. Patients may present with:
   a. Expiratory wheezing
   b. Coughing
   c. Generalized shortness of breath
7. When evaluating the patient's history, investigate precipitating factors such as:
   a. Allergens
   b. Irritants
   c. Humidity
   d. Exercise
8. Monitoring
   a. During each home visit with a patient who has asthma, it is important to do a thorough examination of the patient's respiratory system and the environment.
9. If the patient presents with exacerbating factors that are not relieved by the standard EMS treatment or by the parameters that the primary care physician has set, then it is essential to initiate aggressive airway management such as:
   a. Short-acting bronchodilators via nebulized treatment
   b. Intravenous (IV) corticosteroids
   c. Continuous positive airway pressure (CPAP)
   d. Intubation
10. Effective monitoring and thorough assessments will most likely decrease the need for aggressive treatment.
11. The National Institutes of Health has published guidelines and an example of a plan of care for asthma. The guidelines are:
   a. Control factors that contribute to asthma severity (such as allergens and irritants) to improve baseline respiratory status and decrease the frequency of exacerbations.
   b. Monitor respiratory status with objective measures of lung function for diagnosis, for classification of severity, and to assess response to treatment.

c. Use pharmacologic therapy to address the inflammatory nature of asthma.
d. Provide education for a partnership in asthma care, so that the patient and family understand the disease well enough to be motivated to make changes, use medications wisely, and work collaboratively with the physician.

12. By following these guidelines, the community paramedic can help the patient understand and manage the disease effectively.
13. A wide variety of medications are used to manage asthma. They include:
    a. Inhaled corticosteroids
    b. Leukotriene antagonists
    c. Long-acting β_2-agonists
    d. Mast cell stabilizers
    e. Methylxanthines
    f. Anti-immunoglobulin E (anti-IgE)
    g. Short-acting β_2-agonists
    h. Anticholinergics
14. The community paramedic needs to ensure that he or she understands the indications and properties of each class of medications, as it is common to encounter patients on multiple medications for chronic asthma.
15. Education
    a. Patient education and understanding are essential to effective home management of the patient with asthma.
    b. You should:
        i. Try to understand the nature of the disease
        ii. Understand the exacerbating factors
        iii. Work with the patient to establish goals based on the plan of care
    c. Based on local protocols, educate the patient on implementing a self-monitoring system or stoplight action plan.
        i. Green zone: Patient not experiencing symptoms
        ii. Yellow zone: Patient begins to have mild exacerbation
        iii. Red zone: Patients encounter emergency paramedics during acute care calls

B. Chronic obstructive pulmonary disease

1. Chronic obstructive pulmonary disease (COPD) is characterized by chronic inflammation and obstruction of the pulmonary tract.
    a. The intrathoracic or inferior airway becomes blocked at the lobar bronchi, segmental bronchi, and ultimately the terminal bronchioles, including the alveolar ducts and alveolar sacs.
2. COPD is a progressive illness; it is irreversible and incurable.
3. The primary cause of COPD is smoking, although chronic bronchitis, air pollution, and asthma may also lead to its development.

4. COPD progresses very slowly, so that many patients do not recognize the effects of their worsening conditions until they experience difficulty breathing.
5. According to the CDC, chronic lower respiratory disease is the third leading cause of death in the United States, with as many as 15 million Americans having been diagnosed with such disease.
6. Many comorbidities exist with COPD, such as:
    a. CAD
    b. Asthma
    c. CHF
    d. Pulmonary vascular diseases
7. Comorbidities present a challenge to the community paramedic in:
    a. Differentiating the cause of the exacerbation
    b. Making the determination of treatment plans
8. Monitoring
    a. Patients with COPD sometimes have exacerbations quickly over a few hours; others have a significant event that evolves over the course until serious enough to warrant treatment.
    b. Perform a full physical examination; pay close attention to the respiratory system.
    c. Evaluate the patient's "workload" (ie, work of breathing).
        i. Evaluate the patient's normal work of breathing and status prior to first visit with patient.
    d. When evaluating the work of breathing and lung sounds, you will want to evaluate the causes of the change in status.
        i. Patient's underlying condition informs the interpretation of current problems
    e. The key to success when managing a patient with COPD is:
        i. Understanding what the patient's normal is
        ii. Following the plan of care
        iii. Working with the health care team to identify and prioritize treatment goals
9. Management
    a. To help manage patients with COPD, you should follow the patient's plan of care.
    b. The difference with the community paramedic role (as opposed to traditional paramedic) is that you will need to:
        i. Identify exacerbations early
        ii. Intervene at an early stage and prevent significant exacerbations
    c. Management of COPD is very similar to asthma, including the goal of stopping the progression of the disease if possible.

d. Given that smoking is the primary cause of COPD, a key role for the community paramedic is to help the patient understand the need for smoking cessation.
e. Some patients with COPD require extensive workups beyond spirometry, which may include:
    i. Referral to a pulmonologist by the primary care physician
    ii. Incentive spirometry
    iii. Home oxygen supply
    iv. Other breathing devices as required

10. Education
    a. Education for COPD should be tailored to the patient's health literacy level.
    b. Discuss the symptoms and experiences the patient has encountered in the past; suggest ways to lessen or manage yellow zone symptoms.

VI. Common Gastrointestinal Conditions

A. Constipation

1. Constipation is the inability to produce stool three or more times in a 7-day time frame, with the hardening of the stool requiring significant effort (straining) or painful discharge to eliminate.
    a. Chronic constipation is the inability to produce three or more stools or poor stool output in a 7-day time frame over 3 to 6 months' duration or longer.
    b. Frequent constipation can also be considered chronic, referring to patients who experience periods of constipation once a month or more often.
2. Complications from constipation may include:
    a. Hemorrhoids
    b. Anal fissures
    c. Rectal prolapse
    d. Fecal impaction
    e. Diverticulitis
    f. Diverticulosis
3. Constipation is very common, affecting as many as 42 million people in the United States each year.
4. Many factors can influence the incidence of constipation, such as:
    a. Stress
    b. Travel
    c. Pregnancy
    d. Aging
5. It is important for everyone to recognize and assess his or her weekly stool production.

6. The community paramedic is responsible for:
    a. Helping patients recognize their symptoms early
    b. Identifying any red flags immediately to prevent further complications
7. Early detection and prevention of further symptoms are key to a patient-centered outcome.
8. Monitoring
    a. Speak with your patients about their normal passage of stool by asking questions such as the following:
        i. How often do you have a stool?
        ii. Can you describe the stool for me?
        iii. Do you have any concerns about the amount of stool you pass in a weekly period?
    b. When the patient answers, it may be helpful to describe the various stool types by using a tool such as the Bristol Stool Scale.
9. When a patient complains of abdominal discomfort or change in stool habits, you should discuss the specifics associated with the stool:
    a. Frequency
    b. Consistency
    c. Discomfort
    d. Straining
    e. Bleeding
10. Red flags to watch for include:
    a. Severe pain with discharge of stool
    b. Bleeding (hematochezia)
    c. Significant change in odor that is persistent
    d. Bloating
    e. Rapid and persistent diarrhea
11. Risk factors include:
    a. Sudden weight loss of more than 10 pounds (4.5 kg)
    b. Anemia
    c. Family history of gastrointestinal cancers or bowel disorders
    d. Need to manually remove the stool
    e. Age greater than 50 years
12. Management
    a. The management of constipation generally focuses on primary causes of this condition, such as dehydration and use of:
        i. Opioids
        ii. Antacids
        iii. Anticholinergics

iv. Anticonvulsants
v. Antispasmodics
vi. Calcium-channel blockers
vii. Diuretics
viii. Iron supplements
ix. Narcotics

b. Patients who take these medications will need to:
   i. Ensure appropriate hydration by eating more fruits and vegetables
   ii. Add more fiber to their diet
c. Physicians attempt to treat this condition with the least invasive method possible, such as by addressing factors related to diet, fluid intake, and exercise.
   i. "Mobility equals motility"
d. When the patient's constipation is not remedied with these measures, the primary care physician may discuss types of OTC to reduce constipation, such as:
   i. Bulk-forming agents, such as fiber
   ii. Osmotic agents
   iii. Stool softeners
   iv. Lubricants
   v. Stimulants (eg, caffeine)
   vi. Prescription medications (eg, chloride-channel activators; guanylate cyclase-C)

13. Education
   a. Education of a patient with constipation needs to be geared toward the cause of that condition.
   b. After a patient assessment, identify some of the potential causes.
   c. Most of the time constipation is an acute event not requiring further medical intervention.
   d. Talk to your patient and encourage him or her to talk about any abnormality he or she encounters.
   e. Help the patient understand the importance of prevention to avoid complications in the future.

B. Diarrhea

1. Diarrhea is defined as a significant change or alteration in bowel habits, characterized by:
   a. Increased frequency
   b. Decreased consistency
   c. Increased volume of stool (sometimes)
2. Diarrhea is further defined as acute or chronic.

   a. Acute: Sudden change in bowel habits lasting less than 14 days; generally has an infectious cause
   b. Chronic or intermittent: Considered as an alteration (commonly increased frequency rather than quantity) in bowel habits that lasts for more than a month

3. Chronic diarrhea is further classified as:
   a. Secretory
   b. Osmotic
   c. Fatty
   d. Inflammatory
4. Chronic diarrhea is known to significantly impact ADLs for affected people and can ultimately cause a significant decline in status.
   a. Labeled a global burden by the CDC and World Health Organization
   b. Causes 1 out of every 9 deaths among children; second leading cause of death among children
   c. Chronic diarrhea affects 3% to 5% of the US population, putting a significant strain on both individuals and the overall workforce.
5. Monitoring
   a. Most cases of diarrhea are acute and either viral or bacterial in origin; people at risk for dehydration can develop complications even in early stages of acute or chronic diarrhea.
   b. As a community paramedic, it is important to establish what is normal for the patient.
6. Red flags for patients with acute or chronic diarrhea include sudden changes such as:
   a. Watery discharge
   b. Bleeding
   c. Extremely foul change in smell and composition
7. Management
   a. Treatment primarily focuses on removing the cause; the preferred approach is to:
      i. Ensure adequate adsorption of nutrients
      ii. Restore appropriate intestinal structure and function
   b. In most cases, patients require only supportive treatment, such as:
      i. Electrolyte supplementation
      ii. Hydration supplementation
   c. Patients with chronic diarrhea may require long-term supportive treatment with electrolyte management, along with OTC medications such as:
      i. Loperamide (an antimotility drug)
      ii. Bismuth subsalicylate

d. Prescription medications such as antispasmodics and 5-HT_3 agonists are commonly administered to control noninfectious diarrhea.
e. When the diarrhea has an infectious cause, many different forms of antibiotics may be prescribed, such as ciprofloxacin, azithromycin, erythromycin, doxycycline, and metronidazole.
f. Regardless of the treatment and management regimen selected, this condition can easily spin out of control—especially in:
    i. Older patients
    ii. People with significant medical comorbidities
    iii. Children
g. The community paramedic should perform simple assessment techniques such as:
    i. Evaluating skin turgor
    ii. Performing an ECG
    iii. Electrolyte monitoring (if local protocols permit)

8. Education
    a. Due to the significant differences in types of diarrhea, it is important to:
        i. Discuss the aspects of each stool; help patients understand normal
        ii. Explain how to identify abnormalities
        iii. Emphasize that they should not be concerned with occasional mild abnormalities
        iv. Encourage patients to start a stool log
    b. Some patients with chronic diarrhea may encounter significant life complications such as the inability to work and perform ADLs.
        i. Apply a depression screening scale
        ii. Recommend appropriate psychological treatment

VII. Common Genitourinary Conditions

A. Dysuria

1. Dysuria is a change in urine production or volume that is associated with the urinary bladder or urethra.
    a. Normal urine production is roughly 1 to 2 quarts (1 to 2 L) a day for most healthy adults.
2. The most common cause of dysuria is urinary tract infection (UTI); however, it can also occur secondary to a structural change, such as:
    a. Vaginal atrophy in postmenopausal women
    b. Sexually transmitted infections
    c. Prostatitis or urethritis in men
3. Urinary tract infection is an inflammation of the urinary tract that causes:

   a. Pain
   b. Discomfort
   c. Complete urinary tract blockage (sometimes)
4. According to the CDC, UTIs are the most common health care-associated infection, and catheter-associated UTIs are the most common nosocomial (hospital- or health care-acquired) infection.
   a. An estimated 75% of these infections are associated with urinary catheters, and as many as 25% of hospitalized patients receive urinary catheters.
   b. Infection is the most common cause of acute or subacute altered mentation in older adults, and such infection is often associated with or begins in the urinary tract.
5. Monitoring
   a. When assessing a patient with change in urine production, the community paramedic will need to evaluate if this is:
      i. A change in production (eg, associated with kidney disease)
      ii. A urinary tract change
   b. This distinction can be made by performing an in-depth assessment of the patient's symptoms. Ask questions such as the following:
      i. How many times do you urinate each day?
      ii. Have you had any discomfort, discharge, or change in urination recently?
6. Identifying the cause at an early stage is critical: the earlier an infection is caught, the more likely it can be treated with a noninvasive antibiotic or treatment modality.
7. As with all infections, it is important to fully assess each aspect of the symptoms and document them in detail.
   a. After reviewing the results of a follow-up visit physical examination, the medical director may refer the patient to the primary care physician to see the patient for further evaluation or to perform lab tests.
8. Management
   a. Management of a patient with UTI requires:
      i. Performing a patient assessment
      ii. Ensuring the patient receives education on how to prevent infections
   b. Depending on local protocols, the medical director or the primary care physician will monitor the patient's symptoms and provide appropriate medications and supplements.
   c. As UTIs generally do not create complications beyond a week, management of women with acute uncomplicated lower tract infections may focus on:
      i. Hydration
      ii. Frequent urination
   d. With acute pyelonephritis (kidney infection) in women, management is geared toward appropriate hydration with water.

i. Complications rarely last beyond a week
ii. Some require antibiotics
iii. Follow local protocols

e. Should these types of infections become a chronic issue:
i. Discuss the potential causes
ii. Patient will work with the primary care physician to decrease the likelihood that the infection will spread.

f. Men with UTIs require a more extensive evaluation and sometimes have more complicated symptoms secondary to the anatomic differences in the male urinary tract.

g. With all patients, but specifically with older adults, it is very important to look for key indications that the infection has spread, such as:
i. Tachycardia
ii. Altered mentation
iii. Tachypnea
iv. Fever
v. Dizziness

h. Patients whose symptoms have not improved or have worsened may require more aggressive treatment, such as IV antibiotics.

9. Education
a. Education surrounding all infections of the urinary tract should focus on preventive management measures, such as:
i. Hydration
ii. Appropriate hygiene

b. Be aware that some patients feel uncomfortable speaking with community paramedics of different genders about urination-related issues, so be sensitive to the patient's needs.
i. Try to have a community paramedic of the same gender present during the evaluation or available to provide the education.

B. Kidney disease/failure

1. Kidney disease is defined as a decrease in function or failure of the kidneys to filter waste and excess fluid that is secreted in urine.
a. Disease evolves over time
b. Considered a chronic condition
2. Kidney failure is total inability to produce or filter urine.
3. Acute kidney failure can occur secondary to:
a. Ischemic issues
b. Over-diuresis
c. Pyelonephritis
d. Infectious causes

4. Chronic kidney disease affects many people—more than 10% of the global population and more than half of all older adults.
    a. In the United States, more than 26 million adults are believed to have chronic kidney disease.
    b. The most prevalent causes of chronic kidney disease include hypertension, hyperlipidemia, diabetes, and cardiovascular disease.
5. The kidneys regulate both volume and electrolyte status in the body.
    a. Chronic kidney disease can cause significant complications such as inability to maintain adequate euvolemia (fluid balance) or hyperkalemia.
    b. As with all medical conditions, it is important to:
        i. Evaluate
        ii. Treat
        iii. Prevent further damage
    c. Often chronic kidney disease is not diagnosed until an advanced stage and sometimes not until full failure exists.
6. Stages of kidney disease
    a. Renal disease is classified into 5 stages, and the glomerular filtration rate (GFR) is the most common way to determine the stage of kidney disease.
        i. The GFR measures the amount of blood that passes through each glomerulus during 1 minute.
        ii. The glomeruli are filters of the kidneys; that is, they are responsible for eliminating/filtering out waste from the blood.
7. Creatinine: primary chemical waste molecule produced by muscle metabolism
    a. Good indicator of kidney function, although its level differs in men versus women
    b. Normal readings are usually in the range of 0.7 to 1.3 mg/dL for men and 0.6 to 1.1 mg/dL for women.
    c. Establish the normal lab value for each patient prior to the enrollment visit if possible.
8. Blood urea nitrogen (BUN) is another test whose result is an indicator of renal function.
    a. The amount of urea nitrogen in the blood can vary, but usually falls within the range of 6 to 20 mg/dL.
9. Monitoring
    a. When treating patients who have kidney disease, who require diuretics, or who have significant risk for kidney disease, the community paramedic should (per the plan of care) establish the patient's:
        i. Normal BUN
        ii. Serum creatinine
        iii. GFR
10. Diuretics will have a significant impact on GFR.

   a. At low doses, they can have positive effects; however, they may occasionally have negative effects, such as causing acute renal failure or increasing the stage of renal failure.

11. End-stage renal failure is common and must be treated with:
   a. Dialysis
   b. Renal transplant
12. Dialysis is the artificial or mechanical filtration of blood via machine.
   a. There are two types of dialysis: hemodialysis and peritoneal dialysis.
13. Hemodialysis is the mechanical filtering of blood to remove waste and maintain appropriate electrolyte values by IV implanted devices.
   a. Procedure generally performed in a dialysis center with qualified medical personnel
   b. Takes about 4 hours to complete
   c. Patients require placement of an arteriovenous (AV) fistula, AV graft, or central venous catheter.
14. Peritoneal dialysis allows the body to filter the blood more naturally.
   a. In this technique, the peritoneal cavity is filled with dialysate through a surgically implanted device.
   b. The blood is then filtered by the arteries that line the abdominal cavity, and the dialysate draws the waste out of the blood, allowing it to be filtered out into the machine.
15. Management of chronic kidney disease requires:
   a. Diligent monitoring of urine production
   b. Management of comorbid disease(s)
   c. Close monitoring of GFR
16. Good practice is to determine the patient's normal lab values and urine production per the plan of care.
   a. This baseline will help you interpret any subsequent variations in these parameters.
   b. Verify with the plan of care any specific restrictions that the patient may have.
17. Some common diet limitations in patients with chronic kidney disease are:
   a. Limiting total fluid intake to 1,500 to 2,000 mL/day
   b. Eating less protein in the latter stages of the disease
   c. Restricting sodium to 2,000 mg/day
   d. Ensuring that the patient has a sufficient caloric intake to prevent drastic weight loss
18. Loss of valuable electrolytes is common for a patient when he or she has renal disease—specifically sodium, potassium, and calcium.
   a. The patient's electrolyte levels will be monitored via lab tests.

19. Education
    a. Education related to chronic kidney disease should focus on the patient's comorbidities as well as the issues stemming from the kidney disease.
    b. Help the patient understand the worrisome symptoms associated with kidney disease, such as:
        i. Slow or sudden decrease in urine production
        ii. Rapid weight gain
        iii. General fatigue and dyspnea on exertion
        iv. Muscle cramping
        v. Frequent urination, especially at night
    c. Consult with the medical director on patient questions about special diets and OTC medications, vitamins, herbs, and supplements.
    d. Dialysis will not cure kidney disease; rather, it is simply a replacement for the normal kidney function.
        i. Many times patients must be on dialysis for the rest of their lives.
        ii. In cases of acute kidney injury/failure, some hospitals can perform acute dialysis that leads to return of the kidney function; unfortunately, some of these patients will require some form of chronic dialysis.
        iii. Discuss this issue with such patients.

VIII. Common Musculoskeletal Conditions

A. Arthritis

1. Arthritis is a rheumatic disorder that involves one or more joints with pain and/or inflammation.
    a. Rheumatic (musculoskeletal) disease is pain in the joints and muscles that commonly causes stiffness.
    b. It encompasses a variety of conditions and syndromes.
    c. Taken together, arthritis and rheumatic disease are the number one cause of disability in the United States, affecting more than 50 million people in this country—nearly 1 in every 5 people older than 18 years.
2. According to the Arthritis Foundation, there are more than 100 different types of arthritis.
3. The general guidelines of care for patients with any type of arthritis are the same.
    a. Identify the specific disease
    b. Provide education, symptom relief, restoration of motion and function, and correction of deformities (through surgery)
    c. Monitor and guide the patient's emotional health and suppression of symptoms.
4. The two forms of arthritis that the community paramedic is most likely to encounter are:

a. Osteoarthritis
b. Rheumatoid arthritis

B. Osteoarthritis

1. Osteoarthritis is the single most common form of arthritis and is sometimes referred to as degenerative joint disease or wear and tear disease.
   a. Osteoarthritis is the degeneration of articular cartilage and the joint, typically over the course of many years.
   b. It is also believed to involve damage to the bone and synovium, which leads to further degeneration.
   c. Patients may present with severe pain or inflammation to the joints.
   d. In the hands, findings may include pain, limited motion, and enlargement of the interphalangeal joints.
   e. Common radiographic findings in patients with osteoarthritis include:
      i. Non-uniform joint space loss
      ii. Osteophyte formation
      iii. Cyst formation
      iv. Calcification of the cartilage
      v. Subchondral sclerosis
2. Spinal degenerative changes are also very common in osteoarthritis, with patients often reporting:
   a. Stiffness of the neck or back
   b. Pain with movement
3. Another issue that could present is compression of the spinal nerve roots, causing neuropathy. Spinal stenosis can cause further complications.
4. Monitoring
   a. Routine monitoring of patients with osteoarthritis includes assessment of functionality of the joints.
   b. Ensure that you have exposed the joint or area you are evaluating, and look for:
      i. Inflammation
      ii. Limitations in movement
      iii. Crepitus
      iv. Painful movement
      v. Strength
      vi. Range of motion and passive range of motion
   c. Do not attempt to move a joint beyond normal motor function and stop at any sign of discomfort and contact the medical director.
   d. Document all assessment findings and duration of symptoms as well as exacerbating factors.
   e. Follow local protocols on performing range of motion assessments.

5. There are some red flags that may present during the patient assessment. These findings include:
    a. Weight loss, which could be secondary to metastatic disease
    b. Fever and chills, which could be secondary to septic arthritis
    c. Cutaneous nodules which could be indicative of gout or rheumatic arthritis
    d. Conjunctivitis, which could occur secondary to rheumatoid arthritis
    e. Diarrhea, which could also be indicative of rheumatoid arthritis
    f. Dysuria or urethral discharge, which could be caused by reactive arthritis
6. Management
    a. The initial management is to ensure that the patient exercises at least twice a day and avoids activity that causes pain for more than 2 hours.
    b. Some patients have found relief with:
        i. Braces
        ii. Orthotics
        iii. Some form of support to the joint
    c. Patients who are obese should be encouraged to lose weight and abstain from a sedentary lifestyle.
    d. In addition to using nonsteroidal anti-inflammatory drugs (NSAIDs), many patients may seek complementary therapies, such as acupuncture, for their pain.
        i. Current guidelines do not support the use of chondroitin sulfate or glucosamine for hip and knee osteoarthritis.
    e. Discuss any changes in the patient's condition with the medical director.
    f. Consult the plan of care for specific exercise guidelines.
    g. Help the patient understand the overall treatment/management process.
    h. Ensure that the patient is able to perform all ADLs.
7. Education
    a. Education around osteoarthritis is focused on ensuring the patient understands the severity of the disease and appropriate management techniques.
    b. Assess patient's understanding of his or her symptoms by asking open-ended questions such as the following
        i. Do you feel any changes or limitations in movement?
        ii. Do you have any changes in pain that you believe are associated with your arthritis?
    c. Develop a diary or log of symptoms if appropriate; the patient can then take the document on visits to the primary care physician and use it as a basis for ongoing discussion.

C. Rheumatoid arthritis

1. Rheumatoid arthritis (RA) is a chronic autoimmune, polyarthritic inflammatory disease.

   a. The etiology of RA is unclear, but it is suspected to be a systemic inflammatory process that primarily affects the synovial membrane of the joints.
2. Most common symptoms appear in the hands and feet first, including deformities such as:
   a. Hammer fingers
   b. Boutonniere
   c. Flexion deformities of the toes
3. Patients generally experience a long progression of this disease, and it may be episodic in nature, with patients having:
   a. Only a few joints being affected (mimicking osteoarthritis)
   b. Morning stiffness
   c. Fatigue without pain
4. Other patients have a rapid onset of the disease.
5. Rheumatoid disease is the most common inflammatory process in adults and decreases life expectancy in this population.
   a. It affects more than 1.3 million people in the United States, and is especially prevalent in women.
   b. Approximately 1% to 3% of all women may ultimately develop RA.
6. To confirm the presence of this disease, physicians rely on a comprehensive approach involving:
   a. Multiple differential diagnoses
   b. Laboratory tests
   c. Radiographic examinations
7. Rheumatoid factor is one lab test used in the diagnostic process, but it may take weeks to months from the disease's onset to become positive.
8. Monitoring
   a. Patients may experience systemic changes rather than the specific changes associated with osteoarthritis.
   b. Notify the medical director if the patient presents with:
      i. Sudden-onset illness
      ii. Fever
      iii. Chills
      iv. Significant impairment of function
9. Management
   a. Patients with RA are prescribed:
      i. Disease-modifying antirheumatic drugs (DMARDs)
      ii. Biologics
      iii. Corticosteroids

b. DMARDs often administered for this indication include methotrexate, hydroxychloroquine, and sulfasalazine.
c. Biologic treatments for RA include abatacept, adalimumab, anakinra, etanercept, and rituximab; these agents are often combined with a DMARD—especially methotrexate.
d. Many patients with arthritis have multiple comorbidities, so the primary care physician must take into account the treatment modalities used for the patient's other conditions, such as CHF, hepatitis, or cancer.
e. Follow the patient's plan of care. Discuss any changes in the patient's condition with the medical director. Follow local protocols, and ensure that the patient is able to perform all ADLs.

10. Education
    a. Education around osteoarthritis focuses on ensuring the patient understands the severity of the disease and appropriate management techniques.
        i. RA is not curable, but rather is managed to lessen its effects on patients' function over the remainder of their lives.
    b. Patients with RA may have intermittent issues with this disease; that is, they may not suffer from chronic distress, as the disease may go into remission.
    c. Achieving remission of RA is the goal of any therapy for this disease.
    d. Many medications and therapies for RA may take weeks or months to achieve a peak response.
    e. Discuss other treatment options such as therapy for depression or other psychological issues if appropriate.
    f. Ask open-ended questions such as the following:
        i. Do you feel any changes or limitations in movement?
        ii. Do you have any changes in pain that you believe are associated with your arthritis?
    g. Have the patient create a diary or log of symptoms, if appropriate, which the patient can then discuss with the provider.
        i. Have patients write down specific instances, events, or locations where the symptoms may have started.

IX. Common Integumentary Conditions

A. Wounds

1. As a community paramedic, you need to:
    a. Understand the stages of wounds and the appropriate therapies
    b. Follow the patient's plan of care and local protocols
    c. Consult with the medical director if you have any questions about the patient's condition or care

2. Types of wounds
    a. Contusions
    b. Abrasions
    c. Lacerations
3. Contusion: an injury that leaves the epidermis intact
    a. It occurs when there is damage to the cellular, vascular, and/or lymphatic system but the skin remains intact.
    b. A contusion causes a buildup of blood under the skin—in other words, a bruise.
4. Abrasion: a scraping-like injury to the epidermis and tissues below it, such as the cellular, vascular, and lymphatic tissues.
    a. The result is a multiple-system injury similar to the damage associated with a burn.
5. Laceration: a sharp cut or tear of the epidermis or deeper tissue
6. As a result of aging and other medical conditions, people may experience breakdown of their:
    a. Vascular systems
    b. Lymphatic systems
    c. Nerves
7. Once deep-tissue injury occurs:
    a. The healing process is much more complex.
    b. The injury may require significant treatment.
    c. Such significant breakdowns create a prime environment for a skin ulceration to occur.
8. A skin ulceration is a wound that occurs on the skin and cannot obtain the appropriate circulation that would allow it to heal.
    a. Venous skin ulcerations are common, such as those associated with deep venous thrombosis. They are caused by a breakdown in the venous valvular system that causes a “backup” or pooling of the blood.
    b. Neuropathic skin ulcerations occur in conjunction with damage to the nerve endings in the skin; a person may incur an injury but not feel it due to the existing damage in the skin.
    c. Pressure ulcerations/wounds are caused by pressure between the skin and the bony tissue, which leads to a lack of circulation and ultimately creates necrotic and damaged tissue.
        i. This breakdown can occur over long periods, but may begin in as little as 30 minutes.
        ii Pressure ulcerations have been found to be a significant factor in the care of older adults and people with disabilities.
        iii. Any patient who has a sedentary lifestyle or who is unable to move frequently (three or more times per hour) may be at high risk for pressure

ulcerations and should be encouraged to move so as to lessen the likelihood of a pressure ulceration developing.

9. Other types of wounds are found in postsurgical patients.
10. Monitoring
    a. During home visits, community paramedics should ask questions about the:
        i. Potential for skin breakdown
        ii. Any possible injury
    b. A full evaluation of the skin should be performed in any location that has encountered:
        i. Lack of circulation
        ii. Venous stasis
        iii. Potential for pressure lasting longer than 30 minutes—for example, bony prominences, buttocks, heels, back, and hips
    c. Should a wound develop, it should be evaluated and assessed each visit.
    d. When evaluating the wound, the community paramedic should measure its circumference and describe it in as much detail as possible.
        i. Move from center to the healthy tissue
        ii. Describe each level of breakdown
        iii. Evaluate all aspects of perfusion
        iv. Notice any changes
        v. Follow local protocols
11. Management
    a. Management of all wounds should focus on:
        i. Decreasing the likelihood of reinjury
        ii. Creating a prime environment for healing to take place
        iii. Ensuring that the patient has sufficient intake of protein, vitamin C, and fluids
    b. Patients should stop intake of nicotine and caffeine.
    c. Contusions, abrasions, and lacerations are treated with:
        i. RICE (rest, ice, compression, and elevation)
        ii. Bleeding control
        iii. Pain management
        iv. Sutures (sometimes)
    d. Many wound care clinics, home health agencies, and hospitals offer a variety of in-depth treatments for patients with prolonged wounds:
        i. Doppler evaluation
        ii. Wound debridement
        iii. Complex wound dressings
        iv. Negative pressure therapy

v. Surgical therapy

e. These facilities may also offer counseling such as nutritional and disease-specific education.

12. Education
    a. Education should be based on:
        i. Preventing such wounds from occurring
        ii. Limiting further damage to the tissue when wounds are present
    b. Patients should be encouraged to take steps to prevent damage to the skin and to evaluate the skin daily if they have:
        i. Severe venous stasis
        ii. Lack of circulation
        iii. Neuropathic damage
    c. Help patients understand the normal anatomy and physiology of wound response by the body.
        i. Educate them about aging and other comorbidities
        ii. Discuss specific diseases (eg, neuropathy)
        iii. Help patients understand the community paramedic's and other health provider's roles in preventing and treating wounds

X. Common Neurologic Conditions

A. Cognitive decline or impairment

1. Decline in cognition may be evidenced by:
    a. Memory loss
    b. Changes in personality
    c. Reduced mental capacity
    d. Decreased overall cognitive function
2. Symptoms can:
    a. Appear mild
    b. Be noticeable and measurable
    c. Be reversible (if caused by thyroid disorders or vitamin deficiencies)
3. Dementia is not a specific disease, but rather a description of symptoms that cause cognitive decline in one form or another.
4. Forms of dementia (different diseases; managed differently) include:
    a. Alzheimer disease
    b. Vascular dementia
    c. Frontal lobe temporal dementia
    d. Lewy body dementia
    e. Parkinson dementia

   f. Wernicke-Korsakoff syndrome
5. Generally, a patient is first diagnosed with mild cognitive impairment (MCI)
   a. May not affect patient's ability to perform ADLs
   b. Still somewhat noticeable
6. Screening for MCI is performed by the patient's primary care physician, usually with a cognitive assessment tool such as the Montreal Cognitive Assessment (MoCA) Mini-Cog test.
7. Monitoring
   a. The community paramedic identifies the loss in cognition and specific findings that would warrant referral for:
      i. Further testing by the primary care physician
      ii. Further cognition tests performed by the community paramedic (if community paramedicine program allows)
8. It is important to differentiate between a brief lapse in memory (forgetting to take medicine one time) and a chronic issue (repeatedly forgetting to take medications).
9. As a community paramedic, if you suspect MCI or any form of cognitive decline, you should:
   a. Discuss the patient's family history of such conditions
   b. Evaluate risk factors such as hypertension
   c. Identify comorbid conditions such as vascular disease or stroke
   d. Identify behavioral manifestations
   e. Identify any symptom onset or progression
10. Be alert for sudden-onset changes in cognition that must be identified early to be corrected, such as those that occur with:
   a. Hypoxia
   b. Vitamin B_{12} deficiency
   c. Depression
   d. Hypothyroidism
11. Ask patients questions such as the following:
   a. Have you found that you have frequently forgotten things lately?
   b. I know we have talked about "sometimes" forgetting things, but how do you define "sometimes"?
   c. How often do you feel frustrated about memory loss or have you found that your mood/memory changes during certain times of day?
12. Discuss the onset, provocation, and duration of the patient's symptoms with family members and caregivers.
13. Management:
   a. Must focus on the specific cause of the cognitive decline
   b. Includes medications, behavioral therapies, or a combination

14. Education
    a. Reassure patients that you and their primary care physicians are there to help them manage their symptoms.
    b. Encourage patients to provide full information and full honesty.
    c. Help patients know when to seek help or implement specific management techniques
    d. To make the best use of resources, understand the health literacy level of the patient with any form of cognitive decline.
        i. Patients must fully remember, understand, and be able to perform the tasks required to manage their diseases.
        ii. Encourage the patient's social network to be involved in helping the patient as much as possible.

B. Alzheimer disease

1. Alzheimer disease is the most common form of dementia, accounting for 60% to 80% of all such cases.
    a. More than 5 million people in the United States have Alzheimer disease.
    b. National Alzheimer's Project Act (2011)
2. Disease stages
    a. Alzheimer disease is incurable, so the goal is:
        i. Early identification
        ii. Symptom recognition
        iii. Prevention of progression to the extent possible
        iv. Allocation of appropriate resources as soon as possible
    b. The disease is classified into three stages:
        i. Mild
        ii. Moderate
        iii. Severe/end stage
3. Early symptoms of Alzheimer disease may present 10 years or more before the patient develops further cognitive issues.
4. Patients with early-stage disease have not lost the ability to function independently, but may have:
    a. Periods of forgetfulness or struggle to come up with the right words
    b. A loss of concentration
    c. Depression or apathy
    d. Issues with normal ADLs, such as paying bills or handling money
5. Patients with moderate-stage disease:
    a. Exhibit problems with language, sensory, reasoning, and conscious thought
    b. Have hallucinations, disorientation, and confusion
    c. Begin to lose ability to perform ADLs (putting on shoes or clothing)

   d. Put a heavy workload on their primary caregivers; they will require more and more assistance as the disease progresses
6. Patients with final or severe-stage disease, brain tissue begins to shrink significantly, so these patients:
   a. Are unable to communicate
   b. Cannot perform ADLs
   c. Require around-the-clock care
7. These patients are very vulnerable to infections, as their normal defense mechanisms, hygiene, and ability to walk or swallow may be impaired.
8. Monitoring
   a. The community paramedic should:
      i. Monitor older patients for warning signs of Alzheimer disease
      ii. Document any changes that may be noticed/assessed
   b. Patients with diagnosed disease should be closely watched, as people with cognitive decline:
      i. May experience either slow or rapid progression of their dementia
      ii. May have difficulties managing their other disease processes
   c. One of the best ways the community paramedic can monitor patients with Alzheimer disease is based on the time and location of visits.
      i. Watch patients in natural environment
      ii. Discuss the patient's progression with family/significant others
9. Patients with Alzheimer disease may be challenging to manage
   a. Upset about loss of abilities or memories
   b. Refuse all services
10. These patients are at high risk for:
   a. Self-neglect
   b. Abuse
11. Refer such patients to the appropriate Adult Protective Services agency in the area. Follow local protocols.
12. Management is primarily geared toward:
   a. Recognition of symptoms
   b. Recognition of changes in symptoms
   c. Monitoring for progression of the disease
13. Many behavioral and pharmacologic treatments are available for this disease, but there is no cure.
14. Medications prescribed for early stages of dementia may include cholinesterase inhibitors such as:
   a. Aricept
   b. Exelon
   c. Razadyne

15. Moderate or severe Alzheimer disease may require a combination of:
    a. Cholinesterase inhibitors
    b. *N*-methyl-D-aspartate (NMDA)–receptor antagonist
16. Treatment for late stages of Alzheimer disease:
    a. Memantine (Namenda)
17. Behavioral changes and treatments have also been established to control:
    a. Triggering situations
    b. Irritability
    c. Anxiety
    d. Depression
18. Sleep disruptions may be addressed by ensuring routines are followed, and through use of medications such as:
    a. Tricyclic antidepressants
    b. Benzodiazepines
    c. Atypical antipsychotics
19. Notify the medical director if the patient uses alternative treatments, herbal remedies, and dietary supplements.
20. Navigate the patient and caregiver to local outreach services to provide additional support.
21. Education
    a. Many resources are available.
        i. Alzheimer's Association helpline, website, local chapters
        ii. Only possible to educate patients in the early stages of disease; in later stages refocus education to caregivers

C. Parkinson disease

1. Parkinson disease is a chronic neurologic disease that affects motor neuron response.
    a. Believed to arise secondary to the loss of production of dopamine or the inability to produce an appropriate amount of dopamine
2. Patients commonly experience symptoms such as:
    a. Tremor
    b. Trembling or stiffness in the extremities
    c. Slow movement
    d. Poor coordination and/or balance
3. Patients progress to severe symptoms such as trouble or inability to:
    a. Chew
    b. Swallow
    c. Speak

4. Many genetic and environmental factors may also influence the development of Parkinson disease.
    a. Disease affects approximately 500,000 people in the United States
    b. Average onset of 60 years
    c. Prevalence increased: greater awareness, better identification
5. The diagnosis is based on medical history, neurologic examination results, and symptoms.
6. Four symptoms are used as the basis for diagnosis:
    a. Tremor
    b. Bradykinesia
    c. Postural instability
    d. Rigidity
7. Disease stages
    a. Each person progresses with Parkinson disease differently.
    b. Different symptoms may accompany progression, such as:
        i. Depression
        ii. Emotional changes
        iii. Difficulty swallowing
        iv. Speech control
        v. Dysuria
        vi. Sleep disturbances
        vii. Dementia
        viii. Orthostatic hypotension
        ix. Dystonia
        x. Sexual dysfunction
        xi. Overall fatigue.
    c. General stages include mild, moderate, and advanced disease.
8. Mild Parkinson disease: beginning stage and generally associated with only minimal symptoms
    a. Patients do not require significant changes in ADLs but do continue to experience the primary four symptoms, sometimes unilaterally.
    b. Most of the time, symptoms resolve with medication and exercise.
9. Moderate Parkinson disease: generally affects the body bilaterally
    a. Patients experience episodes such as:
        i. Freezing (movement of the body drastically slows)
        ii. Trouble balancing or incoordination
    b. Medications may become ineffective when their therapeutic levels decline.
    c. Some physical therapy or occupational therapy is required.
10. Advanced Parkinson disease:

a. Patients:
    i. Require assistance almost around the clock
    ii. Are unable to live by themselves
    iii. Generally are unable to walk, and may require wheelchairs or hospital beds
    iv. May not respond to medications or therapies
    v. Progression of the disease may be slow

11. Monitoring
    a. Closely monitor patients to watch the progression of the disease and to decrease the issues surrounding comorbidities or conditions that can become severe if not managed effectively.
    b. Because these issues cause further complications and can cause death, patients should be assessed for:
        i. Genitourinary symptoms
        ii. Fall risks
        iii. Gastrointestinal issues
    c. Follow the plan of care and local protocols.
12. Management
    a. Follow the plan of care.
    b. Management techniques may be based on:
        i. Symptom recognition
        ii. Early detection of progression
        iii. The need for full assistance (eg, skilled nursing facilities, full in-home care, palliative care, and hospice care)
    c. Three classes of medications are commonly prescribed for Parkinson disease:
        i. Dopamine agonists
        ii. Catechol-*O*-methyl transferase (COMT) inhibitors
        iii. Medications to control non-motor symptoms (eg, antidepressants)
    d. During the initial visits of enrollment and intake, community paramedics should fully document:
        i. All symptoms
        ii. Limitations
        iii. Assistance the patient requires
    e. Consider each level of assistance needed and navigate the patient to the appropriate outreach services. Follow local protocols.
13. Education
    a. Many online resources from organizations such as:
        i. The Parkinson's Disease Foundation
        ii. Michael J. Fox Foundation for Parkinson's Research
        iii. National Parkinson Foundation

   b. All education should be focused on:
      i. Coping with the disease and prevention of complications
      ii. Progression as much as possible
   c. Ensure that educational materials are tailored to the patient's health literacy level
   d. Address hygiene needs, fall risks, and other preventive measures as necessary

D. Amyotrophic lateral sclerosis

1. Amyotrophic lateral sclerosis (ALS), also known as Lou Gehrig disease, is a rare progressive neurodegenerative disease that affects voluntary muscle movement.
   a. The neurons that control all voluntary muscles die.
   b. Etiology unclear, but believed to be genetic
   c. Prevalence of 3.9 cases per 100,000 population in the United States and is most prevalent among White males
2. Symptoms of ALS include:
   a. Fatigue
   b. Muscle cramping
   c. Muscle fasciculations
   d. Pain
   e. Depression
   f. Sleep disturbances
   g. Constipation
3. The disease:
   a. Progresses very rapidly, over 3 to 5 years
   b. Affects the entire body
   c. Causes patients to lose all control over all voluntary and involuntary muscles
4. Latter stages of the disease:
   a. Full thoracic paralysis, with patients needing a ventilator for full respiratory support
   b. 24/7 support required fairly rapidly after diagnosis
   c. Aggressive, yet palliative treatment
5. There are no specific laboratory tests or methods that can be used to make a definitive diagnosis of ALS. Potential tests include:
   a. Electromyography
   b. Nerve conduction study
6. Monitoring
   a. Patients with ALS will vary in terms of where their symptoms originate.
   b. Community paramedics should fully document every symptom and any abnormalities in the physical examination.

c. Early symptom monitoring is essential for appropriate treatment of these patients.
d. Any sudden-onset, sustained neurologic change or symptom should be reported to the medical director.
e. Ensure that patients are receiving the appropriate level of care from their social networks.
f. Follow local protocols.

7. Management
   a. Treatment is primarily supportive in nature.
   b. There is no cure, although some medications have been found to alleviate some of the symptoms.
   c. Follow the plan of care.
   d. In the later stages of this disease, patients will require full management and care.
8. Education
   a. To help patients understand this disease, provide an explanation such as the following:
      i. "The neurons or communicators from your brain to your muscles are destroyed, which is why you sometimes have weakness, atrophy, and involuntary twitches."
   b. Educate the patient on devices such as hospital beds and tracheostomies.
   c. Provide patients, families, and caregivers with supportive care and navigate them to outreach services.

E. Huntington disease

1. Huntington disease is an inherited, progressive neurodegenerative disorder.
   a. It is caused by a change in, or faulty gene on, chromosome 4.
   b. The hallmark of disease is the extreme involuntary movements called chorea
      i. Chorea can affect one extremity or an entire side of the body.
   c. Other symptoms include:
      i. Fatigue
      ii. Sedation
      iii. Restlessness
      iv. Hyperexcitability
      v. Anxiety
      vi. Depression
      vii. Unsteadiness
      ix. Rigidity
      x. Seizures
2. Patients die within 15 to 20 years after their diagnoses, and there is no definitive treatment that can slow, stop, or cure the disease.

3. Monitoring
    a. Similar to monitoring of Parkinson disease and any neuromuscular disorder.
    b. Closely assess and monitor all symptoms.
    c. Report symptoms to the provider.
    d. Report any sudden neurologic changes to the medical director.
    e. Ensure appropriate outreach services are provided for patients.
4. Patients with Huntington disease will ultimately require 24/7 care, just as patients with ALS do.
5. Management
    a. Tetrabenazine: only medication approved in the United States for Huntington chorea
    b. As with other neurodegenerative disorders, focus of management is to control and manage symptoms of the disease, not to cure.
6. To help manage patients with Huntington disease, community paramedics should follow the plan of care.
7. Patients with neuromuscular disorders such as Huntington disease are vulnerable to complications from secondary issues such as:
    a. UTIs
    b. Wounds (eg, pressure ulcerations)
    c. Muscle atrophy
8. Work with patients' caregivers to ensure that basic hygiene needs are met and overall symptom management is accomplished.
9. Education
    a. Education for the patient with Huntington disease focuses on the six steps of management:
        i. See your physician.
        ii. Take the medications prescribed, as prescribed.
        iii. Monitor your symptoms daily.
        iv. Maintain a balanced diet for your conditions.
        v. Stay active and exercise as directed.
        vi. Limit or avoid use of drugs, nicotine, and caffeine.
    b. Discuss symptom recognition, and document the patient's progression

F. Multiple sclerosis

1. Multiple sclerosis (MS) is an immune-mediated, unpredictable, and chronic neurologic condition.
    a. Begins as an immune response to an unknown antigen, with the immunologic components attacking the myelin sheath of the nerves.
    b. This response causes a complete breakdown of the myelin, with eventually the nerves themselves becoming damaged or permanently disabled.

   c. Patients begin to have symptoms in midlife (20 to 40 years of age), but follow a variable course of disease.
   d. Symptoms range from blindness to paralysis or inability to balance.
   e. More than half of all people with MS experience some form of cognitive decline.
2. Some forms of MS are described as a relapsing–remitting disease, referring to the disease's tendency to come and go with time.
   a. Relapses: symptoms fully incapacitating; remission: patient may full regain function
   b. Pattern varies; symptoms can persist and cause permanent damage
   c. More than 60% of patients develop a steady progression of the disease without remission, a condition called secondary-progressive MS.
   d. Symptoms range from blindness to paralysis or inability to balance.
3. Approximately 2.3 million people worldwide are believed to have the disease, with as many as 400,000 people in the United States.
4. The exact cause of MS is unknown, although some sources suggest it may be linked to a virus.
5. There is no single test for the disease or identifiable cause of MS.
6. Currently, the diagnosis is made based on:
   a. Physical assessment
   b. Symptoms
   c. Careful medical history
   d. Neurologic examination,
   e. Magnetic resonance imaging
   f. Spinal fluid analysis
7. The criteria for diagnosis are:
   a. Evidence of damage in two separate areas of the central nervous system
   b. Evidence that the damage occurred within a 1-month time span
8. Monitoring
   a. The community paramedic should note and evaluate for any possible acute abnormality of the central nervous system (CNS) or progression of the disease.
   b. Document these findings and notify the medical director.
9. Patients with advanced-stage disease may have significant lifestyle challenges, so continuous therapy (up to around-the-clock care) may be required.
   a. Monitor any devices the patient may require.
   b. Maintain a high suspicion for possible infections, wounds (eg, pressure ulcerations), and UTIs.
   c. Perform in-depth skin evaluations to ensure that no pressure wounds are present.

10. Management
    a. Primarily focuses on treating the symptoms as acutely as possible with:
        i. Corticosteroids
        ii. Plasma exchange
    b. Patients may also be on medications intended to modify or slow progression of the disease, such as
        i. β-interferons
        ii. Glatiramer acetate
        iii. Dimethyl fumarate
        iv. Fingolimod
        v. Mitoxantrone
    c. To reduce fatigue, many patients may receive combination therapy consisting of:
        i. Physical therapy
        ii. Muscle relaxants
        iii. Other medications
    d. Follow the plan of care.
    e. Learn to recognize subtle signs and symptoms so the primary care physician can treat them quickly.
    f. Discuss and evaluate all aspects of the patient's intake and output during the patient assessment, as changes in these parameters may be early signs of complications.
    g. Do not disregard any subtleties.
11. Education
    a. Patient education varies with the patient's progression.
    b. It is important for patients to understand the disease and its potential complications.
    c. The patient's health care team should speak with one voice, and the patient should receive a consistent message.

G. Seizures

1. Seizures are sudden involuntary movements, actions, or thought disturbances, or any combination of these, caused by involuntary electrical impulses in the brain.
    a. There are many types of seizures, but we will focus on epilepsy—prolonged or repeated seizures that occur over long periods.
2. Seizures can be caused by:
    a. Injury (ie, stroke or traumatic brain injury)
    b. Alcoholism
    c. Narcotic ingestion
    d. Medication overdose
    e. Brain tumors

3. Epilepsy is diagnosed by:
    a. Thorough physical examination
    b. Lab tests
    c. Imaging
        i. Electroencephalogram (EEG): most commonly and most accurate way to diagnose seizures
4. Blood testing tends to focus on electrolyte, infectious and genetic causes; tests may also be used to confirm that medications (eg, phenytoin, phenobarbital) are present at therapeutic levels.
5. Monitoring
    a. When patients have been diagnosed with epilepsy, perform a thorough neurologic examination. Evaluate:
        i. The symptoms that occurred during the seizure
        ii. Provoking factors
        iii. Any predispositions that occur with the seizures
6. Notify the medical director if:
    a. You encounter any new signs or changes in the seizures
    b. If the patient experiences new tremors or muscle involvement
7. Self-management should focus on treatments such as:
    a. Taking medications
    b. Keeping appointments with the primary care physician and specialists
    c. Recognizing provoking factors and keeping a log of seizures
    d. Engaging in lifestyle management (eg, getting adequate sleep, avoiding stimulants, and maintaining social support)
8. Education
    a. Education should focus on patients' self-management techniques and what to do when they have seizures.
    b. Seizure First Aid: program includes training for laypeople in seizure management.
    c. Work with family and friends to discuss seizure management.
    d. Follow local protocols.

XI. Pain and Chronic Pain Management

A. Pain

1. Pain is an uncomfortable subjective sensation that occurs with actual, potential, or perceived damage or inflammation of:
    a. Tissue
    b. Nerves
    c. Bone structures

2. There have been many advances in the treatment of pain in the past few decades, with the CDC publishing its most recent guideline on pain management in 2016.
    a. Guideline provides an overview of the differences in and preferences for non-opioid management versus opioid management of patients with chronic noncancerous pain.
    b. Potential for abuse of opioids is clear: 52 people die every day from drug (opioid) overdoses in the United States.
    c. There are no laboratory tests or imaging results to define pain—no objective data.
    d. For a patient-centered outcome, it is essential that pain be managed with an interdisciplinary approach, by multiple health care providers and caregivers who use evidence-based medicine.

B. Classification of pain

1. Pain can be classified in several different ways:
    a. Based on its duration
    b. By the underlying pathophysiology
    c. By the type of syndrome
2. The duration can be:
    a. Acute
        i. Pain occurred rapidly
        ii. Example: New fracture
    b. Chronic
        i. Pain lasting more than a few months
        ii. Back injury that occurred years ago may cause the patient to feel an ongoing uncomfortable sensation of pain.
3. Physiologic (nociceptive) pain is the normal response to injury or acute inflammation of tissues or cells.
    a. Pain is communicated to the cerebral cortex from the localized nerves that are affected via the:
        i. Spinal column
        ii. Brain stem
        iii. Thalamus
4. Physiologic pain can be further subdivided into:
    a. Somatic pain (affecting bone, skin, and soft tissue)
    b. Visceral pain (affecting hollow structures such as the gastrointestinal tract)
5. Pathologic pain:
    a. Has a neuropathic origin
    b. Arises when a structural issue or other abnormality occurs within the nerves
    c. Feelings associated with this sensation:
        i. Burning

ii. Stabbing
iii. Numbness
iv. Tingling
v. Electrical current sensation

d. The patient may experience a lack of sensation for a period, which can lead to diminished reflexes or limited strength in the affected area.
e. This pain is very difficult to manage, and patients may not achieve satisfactory or complete relief from this type of pain.

C. Assessment of pain

1. To effectively manage any condition, the primary care physician must perform a full and comprehensive assessment.
2. Pain, while a subjective phenomenon, must be fully evaluated for:
   a. Location
   b. Quality
   c. Duration
   d. Alleviating or exacerbating factors
   e. Impact on ADLs
   f. Quality of life changes
   g. Past and current management techniques
   h. Any other medical conditions that could be associated with the pain
3. It is important to review all of these aspects and ensure that each is documented.
4. Key to managing these patients effectively:
   a. Effective communication
   b. In-depth assessment
5. In traditional EMS, the mnemonic OPQRST is used to evaluate pain or injury.
   a. In community paramedic's setting, it is essential to evaluate other problems or perceived problems that can exist in patients with chronic pain.
6. Monitoring
   a. At each visit in which you encounter the patient with chronic pain:
      i. Assess the patient's pain along with the assessment parameters mentioned earlier.
      ii. Document these findings.
      iii. If possible, review what other health care providers (eg, physicians, physician assistants, and nurse practitioners) involved in care for this patient have found and note any differences encountered during your patient assessment.
   b. Take time to:
      i. Fully evaluate the patient
      ii. Assess the patient's understanding of the pain

iii. Determine the pain's effects on the patient

c. Reassure the patient that you will work with the health care team to define the best treatment approach in the plan of care.

7. Management
   a. Treatments depend on the assessment and classification of the patient's pain.
   b. The best treatment is to alleviate pain by eliminating or mitigating the cause.
   c. Over time, the patient is prescribed or recommended:
      i. Many medications (OTC and prescription)
      ii. Supplements
   d. Pain contracts are often used when patients are prescribed chronic opioids.
      i. A pain contract is a written understanding and/or agreement between a patient and a provider.
      ii. Highlight the appropriate use of medication, the patient's expected behavior, and the communication to which the patient must commit.
8. Education
   a. Patient education about pain is:
      i. Very complex
      ii. Depends on the classification and assessment of the patient's pain
   b. All patients with pain must understand that they may never attain full relief from the pain.
   c. The goals of the plan of care may include achieving control of the pain that permits functional improvement.
   d. For the community paramedic, it is important to confirm with the plan of care regarding the essentials that the patient should know about his or her specific pain plan.

XII. Common Endocrine Conditions

A. Diabetes

1. Diabetes is a chronic condition characterized by:
   a. The body's inability to secrete an appropriate amount of insulin OR
   b. Production of insulin that the body is unable to use to metabolize glucose
2. Insulin is the primary hormone that allows glucose, amino acids, and other substances to cross the cell membrane, thereby facilitating metabolism and other functions.
3. Diabetes may cause a multitude of complications, such as:
   a. Microvascular disease
   b. Neuropathy
   c. Peripheral vascular disease
   d. Stroke

e. Heart disease

4. Diabetes may occur in conjunction with a variety of conditions, such as:
   a. Obesity
   b. Recurrent infection
   c. Slow-healing wounds
   d. Changes in vision
   e. Abdominal pain
   f. Heart disease
   g. Stroke
5. In women, diabetes may occur in conjunction with:
   a. Menstrual irregularities
   b. Yeast vaginitis
   c. Polycystic ovarian syndrome
6. Paramedics are taught to recognize the symptoms of hyperglycemic state, but these are the later signs of the disease.
7. For community paramedics, the goal should be to identify the earliest symptoms of acute and hyperglycemic states.
8. A definitive diagnosis of diabetes can be made by a series of tests including:
   a. $HgbA_{1c}$
      i. Measures the amount of glucose attached to the red blood cells
      ii. Shows the average amount of glucose attached to the red blood cells over 2 to 3 months (more accurate descriptor of disease status)
   b. Fasting plasma glucose test
   c. Random plasma glucose test
9. When random testing is used, the presence of both of the following is considered diagnostic for diabetes:
   a. Symptoms
   b. A glucose level greater than 200 mg/dL
10. Diabetes is very common in the United States, with type 2 diabetes being the most prevalent form.
    a. In 2014, the CDC reported that 9.3% of the US population—29.1 million people—have diagnosed diabetes; another 27.8 million people are thought to have undiagnosed diabetes.
    b. Diabetes is the seventh leading cause of death in the United States and it causes $176 billion in direct medical costs each year.

B. Types of diabetes

1. There are two primary types of diabetes mellitus:
   a. Type 1 diabetes
   b. Type 2 diabetes

2. A third condition known as prediabetes is also recognized.
3. Type 1 diabetes: a condition in which the body's autoimmune response causes the complete destruction of beta cells in the pancreas
    a. The beta cells in the pancreas produce, store and secrete insulin.
    b. Diagnosed in the early years of life; rarely found in adults
    c. Far less common than type 2 diabetes; accounts for only 5% of the total number of diabetes cases
    d. Can cause deadly states such as diabetic ketoacidosis (DKA), a condition in which a persistently high blood sugar level triggers the body to metabolize fats for energy instead of glucose
        i. DKA: a triad of events—hyperglycemia, then ketosis, and finally acidosis
        ii. Type 2 diabetes can cause DKA, but much more rarely.
4. Type 2 diabetes generally occurs later in life (adult onset); characterized by a chronic hyperglycemic state secondary to a decrease in:
    a. The quality of insulin produced
    b. The sensitivity of the body's cells to insulin
5. This condition evolves over a long period and generally is not found early.
    a. Patients with type 2 diabetes may develop more complications and have irreversible issues.
6. Prediabetes: a chronic hyperglycemic state (fasting plasma glucose greater than 100 mg/dL or 2 hours postprandial plasma glucose of 140–199 mg/dL) combined with an $HgbA_{1c}$ of 5.7% or greater.
7. Monitoring:
    a. All patients with diabetes should have:
        i. Close monitoring of their symptoms
        ii. Physical assessment for progression of disease and complications
    b. The community paramedic should do a thorough examination of the skin to check for:
        i. Infections
        ii. Poor circulation
    c. The primary care physician should conduct blood tests and urine tests.
    d. Foot examinations are essential for all patients with diabetes.
        i. Fifty percent of older adult patients with type 2 diabetes have one or two risk factors for foot ulcerations.
        ii. The community paramedic evaluates all aspects of the skin on the foot and between the toes, as well as the nails.
    e. Findings should be documented and assessed for trends.
8. Management
    a. Management includes prevention of vascular disease to decrease the risk of further complications.

b. Prevention is achieved through:
    i. Blood pressure control
    ii. Tobacco cessation
    iii. Glucose control
    iv. Lowering of lipid levels
    v. Aspirin prophylaxis (sometimes)
c. These measures may also be combined with behavioral or pharmacologic management.
d. The least invasive form of management should be used first to treat the cause or exacerbating factors, such as:
    i. Lifestyle
    ii. Diet modification (lowering of carbohydrate and sugar levels)
e. The community paramedic should emphasize the benefits of increasing:
    i. Intake of fiber, whole grains, fruits, and vegetables
    ii. Exercise
f. Pharmacologic therapy of chronic hyperglycemia includes medication classes such as:
    i. Sulfonylureas
    ii. Biguanides
    iii. Meglitinides
    iv. Thiazolidinediones
    v. DPP-4 inhibitors
    vi. SGLT2 inhibitors
    vii. α-glucosidase inhibitors
    viii. Bile acid sequestrants
g. The most commonly prescribed classes are sulfonylureas, biguanides, thiazolidinediones, and DPP-4 inhibitors.
h. In type 1 and late-stage type 2 diabetes, patients may require insulin therapy. Insulin comes in four specific types:
    i. Rapid-acting insulin works within 15 minutes, peaks in 1 hour, and may work for up to 4 hours.
    ii. Regular (short-acting) insulin begins to work within 30 minutes, peaks in 2 to 3 hours, and may last as long as 6 hours or as short as 3 hours.
    iii. Intermediate-acting insulin begins to work within 4 to 6 hours after injection and may last up to 18 hours.
    iv. Long-acting insulin maintains constant effects over a 24-hour period.
i. The specifics of each type of management/treatment for diabetes should be detailed in the patient's plan of care.

9. Education
    a. Very complex and sometimes overwhelming for many patients

b. Varies on the type and severity of the patient's comorbidities
c. Help patients understand that diabetes is a chronic disease. Symptoms and complications of the disease are managed by the medications—not cured.
d. Patients should understand the correlation between estimated average glucose (eAG) and $HgbA_{1c}$, as this relationship helps patients understand their overall success in achieving glycemic control.

XIII. Common Hematologic/Lymphatic Conditions

A. Sickle cell disease

1. Sickle cell disease is a chronic condition characterized by production of an abnormal form of hemoglobin, which is "S" or sickle shaped.
   a. The deformation decreases:
      i. Hemoglobin's functionality
      ii. Causes problems as it moves throughout the microvasculature
2. The most common form of sickle cell disease is the primary condition known as sickle cell anemia.
   a. Body produces more "S" sickle hemoglobin than appropriate "A" hemoglobin cells.
   b. Any disruption in the size, shape, and function of hemoglobin can cause multiple complications, pain, and even death.
   c. Sickle cell anemia causes multiple complications and can be very complex to manage.
   d. Some patients with this disease require complex treatments such as pain management, antibiotics, appropriate hydration, and blood transfusions.
   e. Whenever a tissue or cell lacks oxygen or the ability to obtain oxygen, it may signal its hypoxic state through pain.
      i. Sickle cell crisis is a vaso-occlusive crisis that is characterized by intense pain.
   f. Complications of sickle cell disease may include:
      i. Recurrent bacterial infections
      ii. Stroke
      iii. Kidney failure
      iv. Chronic pain
      v. Pulmonary hypertension
   g. Sickle cell disease is thought to affect approximately 100,000 people in the United States.
      i. One out of every 365 African Americans has the disease, and 1 in every 13 African Americans has sickle cell trait.
3. Patients with sickle cell anemia should be closely monitored for appropriate hydration and diet compliance.

4. Management includes techniques to prevent sickle cell crisis, such as:
   a. Hydration
   b. Use of the medication hydroxyurea
   c. Blood transfusions
   d. Bone marrow transplants
5. Education
   a. Some patients with sickle cell disease may have other issues, such as chronic pain. Prepare patients for the possibility of such conditions.
   b. Community paramedics should take time to assess the patient's level of understanding of the disease.
   c. Patients with this disease should maintain good hygiene and learn to recognize what has caused exacerbations in the past.
   d. This disease will progress, so the patient needs to understand how and when to seek assistance for emergent situations.

XIV. Common Immunologic Conditions

A. Hepatitis

1. Hepatitis—inflammation of the liver—is typically caused by a viral infection but may sometimes be traced to:
   a. Use of alcohol
   b. IV drug use
   c. Medications
   d. Autoimmune diseases
2. Abnormal inflammation of the liver tissue impairs the liver's ability to function normally.
3. Hepatitis has many forms, but the most concerning are viral.
   a. These types are designated as A, B, C, D, and E.
   b. Community paramedics may work with hepatitis C patients depending on the scope of practice of the community paramedicine program.
      i. Hepatitis C virus is transmitted by blood and other bodily fluids.
      ii. Approximately 15% to 25% of patients who are exposed to this virus clear it without treatment; the remainder develop a chronic infection, and 5% to 20% of them develop liver cirrhosis over the next 20 to 30 years.
   c. Liver cirrhosis:
      i. A severe complication of hepatitis that occurs secondary to the significant scarring caused by hepatitis
      ii. Patient's condition has reached the advanced or terminal stage.
   d. Another significant complication of hepatitis is hepatic encephalopathy.
      i. The liver is simply unable to remove the toxins in the blood.

ii. While generally reversible, this condition can be a significant complication that may lead to death if untreated.

4. Monitoring
   a. Patients with hepatitis have many common physical signs that may indicate further progression or aid in staging their disease.
      i. Jaundice: yellowing of the skin or sclera of the eyes
      ii. Hepatomegaly: an enlarged liver
         a) May be palpated during physical examination
         b) Noted in a diagnostic test such as computed tomography or x-ray
5. Management
   a. Management is primarily supportive and seeks to prevent complications.
   b. If patients demonstrate any red flags, such as altered mentation, alert the medical director.
   c. Many patients will have chronic nausea and/or intractable vomiting, which need to be addressed with:
      i. Appropriate hydration
      ii. Correction of electrolyte abnormalities
   d. Patients with hepatitis are immunocompromised. Do not place them in danger of infection more than necessary.
   e. Follow the patient's plan of care and local protocols.
6. Education
   a. Education should focus on improving their understanding of the causes of exacerbations of their conditions.
      i. Especially important with patients whose exacerbations occur secondary to alcohol intake or sodium intake
      ii. Limit daily sodium intake to 2 g
   b. Patients also need education on how the disease can be spread.

XV. Obesity

A. Overview

1. Obesity is characterized by the abundance and excess of fatty (adipose) tissue throughout the body.
   a. Buildup of fatty tissue may eventually cause complications
   b. Poses an overall risk to the patient's safety and health
2. Obesity is generally considered to be caused by an energy imbalance between:
   a. Caloric intake
   b. Caloric expenditure
3. Diagnosis is based on the patient's body mass index (BMI), which is calculated as follows:

$$BMI = [Weight\ (lb) \div height^2\ (in.)] \times 704.5$$

   a. Obesity: a BMI greater than 30
   b. Morbid obesity: a BMI greater than 40
4. Obesity is a leading cause of death throughout the world.
   a. The obesity rate has doubled since 1980, such that this condition now affects 2.5 billion adults and children.
   b. Obesity is believed to cause more deaths than underweight (ie, starvation).
   c. In the United States, more than one-third of the population is considered obese.
5. Obesity is considered a preventable disease, although some medical conditions can cause significant issues in metabolizing foods, such as:
   a. Certain endocrine disorders
   b. Use of certain medications
   c. Inability to sustain physical activity
6. Obesity is a very complex condition that may have genetic, biologic, metabolic, behavioral, social, economic, and cultural roots.
   a. Many of these causes may be out of the person's control; obesity is not a simple condition of overeating.
7. Obesity causes many complications and serious health issues, such as:
   a. High cholesterol levels
   b. Type 2 diabetes
   c. Hypertension
   d. Metabolic syndrome
   e. Heart disease
   f. Stroke
   g. Cancer
   h. Breathing disorders (eg, Pickwickian syndrome)
   i. Gallbladder disease
   j. Gynecologic and erectile dysfunction
   k. Osteoarthritis
8. Because of the significant stigma associated with obesity, the community paramedic should be nonjudgmental and unbiased toward the patient.
9. Monitoring
   a. Patients with obesity may have many comorbid medical conditions, such as hypertension, CHF, and diabetes.
   b. Monitoring parameters generally not the community paramedic's responsibility unless the community paramedicine program sees patients for more than 6 months.
   c. Evaluate BMI at the initiation of enrollment

d. Investigate any underlying conditions or disorders that may contribute to worsening obesity.
    i. Depression, CHF, COPD

10. Management
    a. Management of obesity is very complex and may involve many other factors.
    b. The community paramedic should:
        i. Evaluate the primary cause of the patient's obesity
        ii. Discuss appropriate intake and nutrition
        iii. Help the patient understand this condition, while remaining gentle and compassionate
11. Education
    a. Education should start with:
        i. Diet
        ii. Physical exercise
        iii. Understanding of intake versus burning of calories
    b. Patients should understand that each meal and all items that they consume will affect them in some way.

XVI. Medical Technology in the Home Setting

A. Community paramedic's role

1. The community paramedic will encounter many various forms of technology in the field.
2. Patient may ask community paramedic to:
    a. Help troubleshoot devices
    b. Provide assistance if a device fails
3. On each visit, the community paramedic should fully evaluate all devices or equipment that assists the patient in any way.
    a. Simple as a guardrail on the stairs or complex as ventricular assist device
4. The community paramedic should gather as much information about each device a patient uses as possible.
    a. The user's manual should be read by the patient and community paramedic.

B. Pacemakers

1. Pacemakers are internal medical devices that regulate the heart's rhythm.
2. Role of community paramedic:
    a. Minimal and supportive in nature
    b. If device was placed recently, evaluate issues
    c. Ensure no device wires or part of device protruding from chest wall
3. Monitoring

a. The community paramedic may perform a 12-lead ECG and transmit it to the medical director for evaluation. Follow local protocols.

4. Management
   a. The community paramedic
      i. Should not be managing the pacemaker
      ii. Discusses any abnormalities or lack of function of the device with the electrophysiologist or provider overseeing device
   b. Many new devices can be tested remotely by a technician.
5. Education
   a. Education is generally provided to the patient in the hospital
      i. Community paramedic should ask patients about what they understand about the device
      ii. Ask them if it functions as a demand or fixed-rate pacemaker.
   b. The newer pacemakers are not vulnerable to inference from microwave ovens, handheld remotes, or televisions.
      i. Common misconception that these interfere with pacemakers
      ii. Some cell phones could cause interference with pacemakers; keep them more than 6 inches (15 cm) away from device

C. Wearable cardioverter defibrillators

1. A wearable cardioverter defibrillator (WCD) (eg, the ZOLL LifeVest) is an external defibrillator that is given to patients who are not candidates for pacemaker placement.
   a. This device allows the patient to:
      i. Have the benefit of a defibrillator
      ii. Be able to carry out ADLs
2. Patients are given the device:
   a. While awaiting placement of a more long-term device
   b. Because they may not survive internal pacemaker placement procedure
3. Community paramedics should:
   a. Help patients understand the importance of the WCD
   b. Ensure appropriate compliance with the requirements
4. Some of these devices can be taken off for hygienic purposes, although these occasions should be limited and removal done rarely.
5. Monitoring
   a. The community paramedic who encounters a patient with a WCD may perform a 12-lead ECG and transmit it to the medical director for evaluation.
   b. Follow local protocols.
6. Management
   a. Management of a patient with a WCD includes ensuring compliance with wearing the device.

7. Education
    a. Discuss the importance of the WCD with the patient.
    b. Determine what the patient understands about the device with questions such as the following:
        i. Why do you wear the device?
        ii. Do you know what it can do to save your life?
        iii. How does it affect your daily routines?

D. Ventricular assist devices

1. Ventricular assist devices (VADs) either fully take over or assist the ventricles in pumping blood to the rest of the body.
    a. Most commonly placed to assist the left ventricle
    b. Right VADs may also be placed in the right ventricle for:
        i. Severe diastolic heart failure
        ii. Severe myocardial infarction
2. VADs are the next-to-last resource for patients with advanced ventricular failure (with a heart transplant being the last resource).
3. Patients eligible for these devices:
    a. Those with advanced systolic heart failure who are in need of a heart transplant (most common)
    b. Those who are ineligible for a heart transplant due to age or other medical complications
4. Some devices are now fully implantable.
5. All VADs contain three parts:
    a. The pump
    b. The controller
    c. An outside energy source (eg, a battery pack)
6. Current-generation (third-generation) pumps are implanted in the abdomen just below the diaphragm.
    a. Controller attached to the belt of the patient
    b. Bilateral suspenders hold the battery packs
7. Older versions had the ability to mechanically pump from outside the body, but the devices used now do not.
8. For patients using VADs, the device is essential for life.
9. Patients now are placed on this therapy for a longer time than in the past.
    a. 80% to 90% of patients are alive 1 year after VAD placement
    b. 60% to 70% are alive 2 years after VAD use begins
    c. Newer studies even suggest that the heart may even be able to heal itself when a VAD is used.
10. The community paramedic should be familiar with VADs and how to troubleshoot problems with them, as these devices may occasionally fail.

11. It is important to fully assess, monitor, and document all findings related to the VAD. During assessment, note:
    a. The device name
    b. The placement of the exit site
    c. Controller function
    d. Battery packs
    e. Overall patient compliance with the device
12. At each visit, ensure that there is no newfound abnormality with the device.
13. Management
    a. The community paramedic may perform a 12-lead ECG and transmit it to the medical director for evaluation. Follow local protocols.
14. Education
    a. When patients receive VADs, they undergo an extensive process of education prior to leaving the hospital.
    b. An entire team of educators will review the device with them
        i. Nurses, physicians, representatives from the device's manufacturer
    c. Community paramedic should:
        i. Obtain a user's manual for each device
        ii. Fully discuss the VAD with your patient to ensure his or her complete understanding of the device
        iii. Familiarize himself/herself with the device

E. Long-term vascular access devices

1. Many patients use a variety of long-term vascular access devices.
2. Central and long-term VADs are placed for a variety of reasons, including:
    a. Inadequate or impossible peripheral IV access
    b. Administration of medications that are irritating to smaller blood vessels
    c. Vasopressor medication infusion
    d. Chemotherapy
    e. Frequent blood draws
    f. Long-term antibiotic therapy
    g. Dialysis
3. There are many different types of devices for vascular access, including:
    a. Peripherally inserted central catheter (PICC): a long IV catheter that is usually placed in the arm and follows the peripheral veins into the superior vena cava
    b. Midline catheter: placed into an upper extremity but not as long as the PICC and does not reach the central circulation
    c. Double- or triple-lumen central catheter: a traditional central line that is placed through the skin in relatively close proximity to a large central vein

   d. Hickman, Broviac, and Ghoshong catheters: three similar brands of catheters that are "tunneled" under the skin and placed into the superior vena cava
   e. Implanted ports (Port-a-Cath or similar): placed completely under the patient's skin and tunneled into a central vein, typically the superior vena cava
   f. Dialysis catheters (Vas-Cath/Permcath): thick-walled, high-volume catheters that are usually placed into a patient's neck, biceps, or groin to provide dialysis
4. Several problems may occur with a long-term vascular access device:
   a. Limited life span
   b. Clog with blood clots
   c. Harbor infections
   d. Present a risk of mechanical failure or accidental removal
5. The role of the community paramedic relative to these devices is to:
   a. Monitor them
   b. Ensure there are no abnormalities at the placement sites
   c. Notify the medical director of any changes/abnormalities
6. Monitoring
   a. The community paramedic who encounters a patient with a long-term VAD may perform a 12-lead ECG and transmit it to the medical director for evaluation.
   b. Follow local protocols.
7. Management
   a. The community paramedicine program determines whether the community paramedic needs to access any of the long-term VADs.
      i. Extensive education by a vascular specialist or medical director is required in such a case.
   b. Refer any questions about abnormalities in the device's size or function and/or need for access to the medical director.
8. Education
   a. Work with patients to ensure that they have received proper education on the devices prior to your involvement.
   b. Have them teach back the information to you, and correcting any gaps in education you find.
   c. Educate patients on appropriate bleeding control measures and ensure that patients are protecting the device as much as possible.
   d. If patients are self-administering medications or otherwise accessing the device, they must understand:
      i. Infectious disease prevention
      ii. Management procedures

F. Medication infusion pumps

1. Patients may receive a wide assortment of IV medications in their homes.
2. Categories of IV medications delivered in the home setting include:
    a. Inotropic medications for CHF
    b. IV nutrition
    c. Chemotherapy
    d. IV antibiotics
3. Many of these medications will be administered with infusion pumps.
4. The community paramedic may encounter devices that infuse medications and may be asked to respond or stand by when an agency is providing IV therapy at home.
    a. Determine the type of infusion system.
    b. Ensure compliance with the "five rights" of medication administration:
        i. Right patient, right drug, right dose, right route, right time
    c. Ensure that the appropriate protocols are observed and online or offline medical control is available.
    d. Follow local protocols.
5. Monitoring and management
    a. Monitor and document each aspect of the medication administration procedure.
    b. If the patient presents with an adverse reaction or the efficacy of the medication does not seem to be appropriate, ensure that the five rights of medication administration have been observed and then contact the medical director.
6. Education
    a. Most patients with medication infusion pumps will have received significant education from the:
        i. Home health agency administering the medication
        ii. Pharmacy providing the device
    b. Discuss patients' understanding of the device and have them teach back the information.
    c. Provide information to fill in any gaps in understanding.
    d. Follow local protocols.

G. Tracheostomy

1. A tracheostomy is a surgical opening created in the anterior aspect of the neck at the inferior border of the cricoid cartilage.
2. Paramedics are familiar with emergent cricothyroidotomy, but a tracheostomy procedure is generally performed in a stable environment after the emergency has been stabilized.
3. A tracheostomy can be either temporary or permanent.
4. Indications for tracheostomies include:

a. Severe trauma
b. Inhalation burns
c. Cancer
d. Reconstructive surgical procedures of the neck
e. Long-term need for intubation such as with chest wall injuries or diaphragm dysfunction as occurs in patients with ALS

5. Most patients will require an initial period of ventilator support, although this therapy is rarely continued at home.
6. A tracheostomy affects the patient's speech, as the site of the tracheostomy is below that of the vocal cords.
7. Note the normal anatomy and physiology of the airway when looking at a tracheostomy.
    a. Tracheostomy tubes function as long-term replacements for endotracheal tubes.
    b. These devices are used for patients who:
        i. Require long-term ventilator support
        ii. Frequent tracheal suctioning
        iii. Airway protection owing to a medical condition such as traumatic brain injury, quadriplegia from any disease, or ALS.
    c. Displacement of a tracheostomy tube may be an immediate threat to life.
    d. Tracheostomy tubes may be placed:
        i. Electively in patients already receiving mechanical ventilation via endotracheal tubes
        ii. In patients with a slowly evolving upper airway obstruction or tumor
    e. The tube passes directly from an opening in the anterior neck, below the thyroid cartilage, into the trachea.
    f. Speech is not possible unless expired air is allowed to pass around the tracheostomy tube and through the larynx (vocal cords).
    g. Patients with tracheostomy tubes need frequent deep suctioning with an appropriate size of suction catheter.
        i. When possible, deep tracheal suctioning is performed.
        ii. Oral suctioning may also be required
    h. Community paramedics should brush up on the suctioning techniques learned in paramedic school.
        i. Work with the patient on techniques such as measuring the suction cannula.
    i. Follow local protocols.
    j. Support the patient as needed per local protocols, and document normal and abnormal findings.
8. Monitoring and management

a. Monitoring of a tracheostomy is the same as monitoring of any other ostomy or surgical opening in the body.
b. Document all findings and note any changes.
c. If immediate changes or infectious changes are apparent, notify the medical director.
d. During each visit, the community paramedic should perform a patient assessment and document all findings.
e. Immediately address any potential life threats and alert the medical director.
f. Ensure that the patient has long-term respiratory therapy and an open line of communication to the agency that is providing this service, including access to a 24/7 on-call line.

9. Education
   a. Education for tracheostomies is similar to that for all ostomies.
   b. Take a step-by-step approach to all education and ensure that the patient fully understands all information provided.
   c. Have the patient demonstrate:
      i. The procedures for suctioning
      ii. Cleaning and replacing the inner cannula
      iii. Decompressing and inflating the cuff
      iv. Using any alternative application devices they may have, such as a speech valve.

H. Oxygen or supplemental oxygen delivery systems

1. Supplemental oxygen systems: provided for patients who do not achieve an optimal oxygen delivery to their system by normal ventilation.
2. Patients with these devices are those who have:
   a. Chronic asthma
   b. COPD
   c. CHF
   d. Morbid obesity
3. Community paramedics should monitor and report any patients who sustain a long-term oxygen saturation (SpO_2) of less than 90% to the medical director.
   a. This will help determine the patient's eligibility for long-term oxygen therapy at home.
4. Monitoring
   a. Monitor the type of device and efficacy of the therapy with:
      i. The patient assessment
      ii. SpO_2 readings
   b. If possible and if local protocols allow:
      i. Monitor end-tidal carbon dioxide ($ETCO_2$)

ii. Ensure that the patient is maintaining adequate levels (35 to 45 mm Hg) or parameters set by plan of care

c. Determine whether the patient is on supplemental oxygen through an oxygen cylinder or via a concentrator.

d. As a community paramedic, you should familiarize yourself with the type of device provided and evaluate every aspect of the device to ensure proper delivery of oxygen.

e. Check the power source, electrical cords, on and off buttons, and delivery tubing from the machine to the patient.

f. Ensure the patency of the tubing; it should not have holes or kinks.

g. Evaluate the patient end of the oxygen system.

i. Assess the patient's work of breathing, lung sounds, airway patency, and the delivery device itself.

ii. Confirm that the patient has not tampered with the cannula and confirm there is a proper seal with the mask.

iii. If the patient has a tracheostomy placement, ensure its patency.

iv. Help patients understand how to self-monitor their symptoms and evaluate their devices.

v. If a device failure has occurred, document it, provide supplemental oxygen if required, and contact the medical director for further direction.

5. Management

a. To help manage patients, follow the patient's plan of care.

b. Ask patients questions such as the following:

i. How do you feel with the device?

ii. Do you feel like it is helping you?

iii. Do you feel like you are not having to work as much to breathe when you are wearing this device?

iv. Have you discussed with your primary care physician why you are on oxygen?

v. Do you have any questions about this device that we can discuss?

c. If the device is providing the ordered therapy per the plan of care (eg, 2 L/min flow) and there is no issue with the device itself, follow the appropriate protocols.

6. Education

a. Ensure that the patient fully understands the oxygen delivery device, including how the device works.

b. Have the patient teach back the information provided, and ask if the patient has any further questions.

c. Review some of the troubleshooting guidelines and assess the patient's understanding of what to do when there is a problem with the device.

d. If the patient continues to have difficulties with the oxygen delivery device, contact the medical director.

I. Surgical drains, NPWT devices, and other postsurgical devices

1. There is a variety of drains and devices that are used following surgery to monitor and assist wound healing and closure.
2. The community paramedic may have to care for patients with many different types of surgical drains and devices.
   a. Wound drains prevent pockets of fluid from collecting at the surgical site, while allowing health care providers to monitor characteristics of the fluid being drained, such as:
      i. Volume
      ii. Appearance
      iii. Composition
   b. Other devices rely on mechanical forces to stabilize a surgical site and promote healing.
3. Monitoring
   a. During the full physical assessment:
      i. Note all aspects of the device, from where it connects to the patient to the device itself.
      ii. Monitor and document the type, amount, and color of the discharge it is suctioning.
      iii. Obtain the user's manual for this device if possible.
      iv. Follow local protocols.
4. Management
   a. Contact the medical director if:
      i. The device fails to work or to hold suction
      ii. There is evidence that the patient is being harmed by the device
   b. Each community paramedicine program will have protocols for such devices.
5. Education
   a. Ensure that the patient fully understands the surgical drain, negative pressure wound therapy (NPWT) device, or other device, including how the device works.
   b. Have the patient teach back the information provided, and ask if the patient has any further questions.
   c. Review some of the troubleshooting guidelines and assess the patient's understanding of what to do when there is a problem with the device.
   d. Contact the medical director if the patient continues to have difficulties with the device.

J. Feeding tubes

1. Patients who are unable to take nutrition orally may receive some or all nourishment from tube feeding.
2. Flexible catheters can be placed through:
    a. The mouth
    b. The nose
    c. The skin
3. These tubes:
    a. Allow nourishment and water to enter the digestive system directly, without the need for chewing or swallowing
    b. Decrease the risk of aspiration in patients who cannot swallow effectively or protect the airway
4. Nasogastric feeding tubes and orogastric feeding tubes are placed from the nose and the mouth, respectively, into the patient's stomach.
5. Other types of feeding tubes include:
    a. Nasoduodenal and nasojejunal tubes
    b. Gastronomy tubes
    c. Jejunostomy tubes
    d. Percutaneous endoscopic gastronomy (PEG) tubes
    e. Percutaneous endoscopic jejunostomy (PEJ) tubes
6. PEG tube allows nutrition, fluids, and medications to be administered directly into the stomach, bypassing the mouth and esophagus.
7. Monitoring and management
    a. Per protocols, at each visit, the community paramedic may:
        i. Monitor and assess the site at which the feeding occurs
        ii. Look for signs of infection and overinflation of the organs
        iii. Confirm the absence of seeping from around the tubing or necrotic tissue surrounding the site
        iv. Monitor for malfunction of the infusion pump and any signs of the patient vomiting or aspirating the tube feeding
        v. Document and assess this information at every patient assessment
        vi. Contact the medical director if there is any obvious abnormality
8. Education
    a. Key to success when patients require tube feeding is patient and caregiver education.
    b. Patient should be able to fully demonstrate the entire feeding process, including aspirating the tube and clearing occlusions.
    c. Patients should be aware of:
        i. How to prepare and place appropriate dressings around the site
        ii. How to recognize the signs of infection and necrosis

K. Ostomies

1. An ostomy is a temporary or permanent surgical placement of a device or opening to rid the body of waste.
2. Most patients are able to function and have no limitations in their normal ADLs when they have ostomies.
3. While the ostomy devices and their locations may differ, their similarities include:
    a. The overall management
    b. Role of the community paramedic
    c. Patient education
4. The role of a community paramedic is supportive and educational in nature.
5. The community paramedic should evaluate the patient's overall understanding of the ostomy and determine how the patient is managing it.
6. Types of ostomies
    a. Colostomy: ostomy performed through the anterior abdominal cavity to connect the large intestine to the outside via a stoma
        i. The site of the stoma depends on the origination or cause of the diversion.
        ii. There is no change in the way in which the intestines work with a colostomy, although some mucus may still be discharged from the anus.
        iii. A colostomy is often performed because of infection, injury, blockage, cancer, and wounds and fistulas in the perineum.
    b. Ileostomy: opening created in the abdominal wall to the small intestine
        i. Common indications for an ileostomy are similar to those for colostomy.
        ii. Some patients with Crohn disease and ulcerative colitis will require an ileostomy after bowel resection.
    c. Urostomy: surgical opening directly to the bladder through the anterior abdominal wall
        i. A urostomy is required secondary to complete blockage and inability to remove the blockage from below the bladder, following postsurgical resection, or following irreversible damage to the urinary tract.
        ii. On occasion, an Indiana pouch is placed to replace the bladder completely; this device is fully drained by the urostomy.
        iii. Unlike a colostomy or ileostomy, a urostomy must be secured with a temporary stent that will keep the location open for continued use.
7. Monitoring
    a. Evaluate and document the site, size, type or name of the device, and any barriers that might prevent the device from completely expelling waste.
    b. Common complications with all ostomies are:
        i. Infection
        ii. Reduction of size
        iii. Blockage of the stoma.
        iv. Mild irritation during the initial placement of the ostomy or device.

c. Evaluate the ostomy—or at least the site—to ensure there are no complications, injury, or infection.
d. Identify and document the properties of the stool or urine.
e. If there are any changes or significant signs of infection, notify the medical director.

8. Management
   a. Management focuses on ensuring there are no changes in the location of the ostomy, problems such as infection, or change in size.
   b. Ensure proper discharge is obtained and adequate waste discharge is maintained.
   c. Discuss with the patient how changes in diet and activity will affect the ostomy.
   d. Help the patient understand "normal" versus "abnormal" in regard to waste discharge.
   e. Follow local protocols.
9. Education
   a. Education should focus on ensuring patients are able to "cope" with their ADLs while having the ostomy in place.
   b. Patients should make a checklist containing all additional items they may need while away from their stock of supplies at home.
   c. Provide education on:
      i. Proper care of the ostomy
      ii. Maintenance of the ostomy
      iii. Replacement of bags
      iv. Cleaning at home
   d. Patients should understand the food items that may change their stool or cause gas.
   e. Discuss common complications of ostomies, such as narrowing of the stoma and blockage of the ostomy tubes or stoma.
   f. Help the patient understand the overall hygiene related to the ostomy and common infectious disease management.
   g. Follow local protocols.

L. Ambulatory assist devices

1. Overview
   a. Ambulatory assist devices are items that help the patient maintain balance during normal ambulation (ie, walking).
   b. Devices vary in size, shape, and function.
   c. This discussion focuses on two standard types:
      i. Canes
      ii. Walkers

d. A cane is a small, one-legged device that allows the user to maintain balance or assists with standing and ambulating.
    i. Some more modern canes have four legs at the bottom.
e. Use of a cane should require only one upper extremity, whether it be with a hand–wrist device or a full-arm device that connects at the elbow.
f. Walkers are generally devices that have four legs and require the use of both upper extremities for balance and stability.
g. These devices come in many different designs, such as:
    i. Four straight legs
    ii. Two legs and two wheels
    iii. All wheels
h. Some walkers can also serve a chair, and some have brakes.
i. These devices may be covered in part by the patient's insurance.

2. Role of the community paramedic
    a. One benefit of community paramedicine is the ability to see patients in their home environments and determine if they need assistance with their ADLs inside their homes.
    b. The community paramedic should:
        i. Document how the patient ambulates
        ii. How well he or she is able to perform ADLs
    c. Document the efficacy of the device the patient uses; evaluate from top to bottom, especially at the joints.
    d. If questions arise about the specific device, obtain the user's manual, look online for information, or discuss the problem with the medical director.

M. Commode chairs

1. Overview
    a. A commode chair is a portable toilet that generally is not attached to a running water supply.
    b. These devices are intended for patients who are either confined to their bedrooms or have extreme difficulty ambulating from the bed to the bathroom.
    c. Commonly found in hospital rooms with patients who have a fall risk, but they may also be found in the home
2. Role of the community paramedic
    a. The community paramedic should evaluate:
        i. The need for a commode chair
        ii. The efficacy of an existing one
    b. Evaluate whether someone is available to assist the patient with appropriate cleaning and maintenance of the device.
    c. Check the device from top to bottom and at joints to confirm its stability

d. Make sure that all contents are disposed of properly in a toilet or appropriate septic system.
e. Follow local protocols.

N. In-home hospital beds

1. Overview
   a. An in-home hospital bed is prescribed to a patient who requires specific positioning during sleep or chronically.
   b. This position requirement, which must be documented, may be associated with a medical disease such as:
      i. COPD
      ii. CHF
      iii. Cardiac disease
   c. Document the severity or frequency of the symptoms.
   d. If specific additions to the device are needed, such as rails, this issue must be documented by the physician as proof of need.
2. Role of the community paramedic
   a. There are many types of in-home hospital beds available, but most follow the same general principles in terms of height, head/leg lift capabilities, and side rails.
   b. Contact the medical director if a patient may benefit from one of these beds but does not currently have one.
   c. If the patient already has an in-home hospital bed, discuss the requirements for the bed and the patient's medical conditions during the enrollment visit.
   d. Evaluate and document the type of device, and become familiar with its functionality.
   e. Evaluate the patient's understanding of how to use the bed.

O. Patient transfer devices

1. Overview
   a. Patient transfer devices allow a health care provider to assist or fully support transfer of the patient from one location to another.
   b. Devices in this category include:
      i. Belts for lifting
      ii. Slide boards for bed-to-bed transfers
      iii. Hoyer lifts
      iv. Draw sheets
      v. Air-assisted transfer mats
   c. All of these devices have very different techniques of operation and require education on the specific device.
   d. During the patient needs assessment, the community paramedic should:
      i. Locate such equipment

ii. Become familiar with the mechanics of the specific device
iii. Work with the provider to develop an educational piece for the patient

2. Role of the community paramedic
   a. Each community paramedicine program will have different requirements for the community paramedic to follow when moving, lifting, or transferring patients.
   b. Discuss these guidelines with the medical director.
   c. As with all devices, ensure that they are clean, free of debris, and structurally sound.
   d. When using a patient transfer device, maintain the appropriate posture during the actual transfer.
   e. When working with the family, ensure that the transfer device is appropriate for the patient.
      i. If the patient needs full assistance, make sure he or she does not only have a transfer belt.

Post-Lecture

Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (**date to be determined by instructor**).

B. Read Chapter 16, "Mental Health," for the next class session.

Chapter 16
Mental Health

Unit Summary

After students complete this chapter and the related course work, they will be able to describe the evolution of the understanding and treatment of psychiatric disorders, explain the difference between psychiatric emergencies and chronic psychiatric disorders, identify the risk factors for violence toward others, explain the strategies to employ when assessing a patient at risk of suicide, describe the tools to use when assessing a patient at risk for substance abuse, identify the signs and symptoms of schizophrenia, bipolar disorder, and depressive disorder and be able to describe the principal therapeutic interventions for those disorders. They will be able to identify the signs and symptoms of anxiety disorder, obsessive–compulsive disorder, and posttraumatic stress disorder and be able to discuss the principal therapeutic interventions for those disorders. Additionally, they will be able to explain how therapeutic communication is utilized to build trust and engage patients and identify mental health providers to whom the patient may be referred.

Objectives

1. Describe the evolution of the understanding and treatment of psychiatric disorders. (pp 285-286)
2. Explain the difference between psychiatric emergencies and chronic psychiatric disorders. (pp 286-287)
3. Identify the risk factors for violence toward others. (p 288)
4. Explain the strategies to employ when assessing a patient at risk of suicide. (pp 288-290)
5. Describe the tools to employ when assessing a patient at risk of substance abuse. (pp 290-292)
6. Identify the signs and symptoms of schizophrenia. (pp 292-293)
7. Describe the principal therapeutic interventions for schizophrenia. (pp 293-294)
8. Identify the signs and symptoms of bipolar disorder. (pp 294-295)
9. Describe the principal therapeutic interventions for bipolar disorder. (p 295)
10. Identify the signs and symptoms of depressive disorder. (pp 295-297)
11. Describe the principal therapeutic interventions for depressive disorder. (pp 297-298)
12. Identify the signs and symptoms of anxiety disorder. (pp 298-299)
13. Describe the principal therapeutic interventions for anxiety disorder. (p 299)

14. Identify the signs and symptoms of obsessive–compulsive disorder. (pp 299-300)
15. Describe the principal therapeutic interventions for obsessive–compulsive disorder. (p 300)
16. Identify the signs and symptoms of posttraumatic stress disorder. (pp 300-301)
17. Describe the principal therapeutic interventions for posttraumatic stress disorder. (p 300)
18. Explain how therapeutic communication is utilized to build trust and engage patients. (pp 301-303)
19. Identify the mental health providers to whom the patient may be referred. (p 303)

Readings and Preparation

- Review all instructional materials including ***Community Health Paramedicine***, Chapter 16, and all related presentation support materials.
- Review local protocols relating to psychiatric emergencies, handling situations where there is a risk of violence, assessing a patient at risk of suicide and substance abuse, identifying the signs and symptoms of a mental health disorder, administering therapeutic interventions, and referrals.

Support Materials

- Lecture PowerPoint presentation

Enhancements

- Direct students to visit Navigate 2.
- Provide copies of local protocols.

Unit Activities

Writing assignments: Instruct each student to put together a scenario for mental health.

Student presentations: Divide students into groups. Instruct each group to act out the scenario for mental health (developed for the writing assignment) for the rest of the class.

Group activities: Discuss and critique each student presentation as a group. Discuss problems regarding identifying the risk factors for violence against others, assessing a patient at risk of suicide, identifying a patient at risk of substance abuse, and identifying the signs and symptoms and principal therapeutic interventions for schizophrenia, bipolar disorder, depressive disorder, anxiety disorder, obsessive–compulsive disorder, and posttraumatic stress disorder.

Pre-Lecture

You are the Community Paramedic

"You are the Community Paramedic" is an opening case study that encourages critical thinking skills.

Instructor Directions

1. Direct students to read the "You are the Community Paramedic" scenario found a the beginning of Chapter 16.
2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question.
3. You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. Mental health

1. One of the greatest challenges you will face as a community paramedic is the close relationship between medical illness and psychiatric disorders.
2. At time of dispatch, roughly two-thirds of 9-1-1 calls are for medical situations and roughly one-third are for psychiatric and behavioral issues.
3. The more we learn about our patients, the more likely we are to see that the patient's mind and body are inseparable parts of a whole person.
   a. A patient with diabetes may have a major depressive disorder that impairs his or her ability to comply with insulin management.
   b. A patient with schizophrenia may be experiencing involuntary muscle contractions after starting a new medication to manage hypertension.
4. As a community paramedic, you have the advantage of having significantly more time to perform a detailed patient assessment and develop a professional health care relationship with the patient.
   a. Taking your time is important when dealing with psychiatric disorders.
   b. You will work to navigate the patient toward self-care and management.

II. A Brief History of Mental Health

A. Negative view of mental illness

1. Ancient Chinese, Hebrew, Egyptian, Greek, and Roman societies associated psychiatric disorders and abnormal behavior with evil spirits and demons.
    a. People affected by psychiatric disorders were deemed "possessed," and emphasis was placed on a lack of morality and character.
2. Unfortunately, people with psychiatric disorders today are still subject to negative moral judgments.
    a. Example: A person who is homeless and sitting on the corner, muttering, unkempt, possibly in the midst of a schizophrenia crisis, is all but invisible to passersby.
    b. Moral judgment is still evident with patients struggling with alcohol and drug addiction, who may be viewed by some in society as lacking in willpower.

B. Freud and the birth of psychiatry

1. The Austrian neurologist Sigmund Freud (1856–1939) was intrigued by the causes of behavior in humans.
2. His ideas changed how personality development is viewed and how inner psychological conflict is discussed and treated.
3. Freud held that we have distinct levels of awareness about our external and internal lives.
    a. Beyond our conscious mind, there is a deeper layer to who we are—a vast storehouse of memories, feelings, daydreams, fantasies, hopes, fears, and experiences.
    b. This information is often "filed away" before we develop mature, rational minds or is absorbed so quickly during traumatic events that we do not have adequate time to process the emotions.
4. Freud believed this information resides in the unconscious mind, which can be accessed only with a great deal of effort—in therapy or during dreams when the rational mind is not engaged.
    a. Example: The military veteran who has returned from combat deployment may access the unconscious mind during flashbacks and distressing nightmares as his or her mind works to process the trauma of war.
5. Freud's work marks the birth of modern psychology and offers a window of understanding into some of the most complex psychotic disorders.

C. Modern neuroscience

1. Modern research in neurophysiology, brain imaging, and genetics has expanded our understanding of the mind.
    a. The areas of the frontal lobe are responsible for executive functioning or what we sometimes call the "rational mind"; these areas:
        i. Mediate our emotions

ii. Control our judgments
iii. Monitor our behaviors

b. The temporal lobes help to control and process our sense of hearing and place regulatory roles in speech.

2. Functional magnetic resonance imaging (MRI) of the frontal lobes and temporal lobes of patients with schizophrenia shows hyperactivity when compared to MRI of the brains of patients without schizophrenia.
3. This hyperactivity may help to illuminate why the hallmarks of schizophrenia include:
   a. Disordered thinking
   b. Auditory hallucinations
   c. Disorganized speech

D. A history of mental health treatment in the United States

1. Until the early 19th century, the United States followed Europe's pattern of housing persons with psychiatric disorders in asylums, jails, and poorhouses.
2. Following investigations of the inhumane and uncivilized treatment of patients in asylums, activists led efforts to establish psychiatric hospitals dedicated to the professional care of patients with psychiatric disorders.
3. By the late 19th century, all of the asylums were closed and dedicated psychiatric hospitals were built across the United States.
4. That emphasis on treatment has since been reversed. Jails and prisons now play a central role in the contemporary response to psychiatric disorders.
   a. By 2016, psychiatric beds numbered only 35,000, and 10 times more patients with psychiatric disorders were in prisons than in state hospital beds.
   b. The driving force behind this dramatic shift can be summed up in one word: deinstitutionalization.
5. Following the discovery of chlorpromazine (Thorazine) and other antipsychotics in the 1950s, public policy shifted to emphasize:
   a. The use of medications
   b. In-community treatment
6. Mental health and health care professionals are familiar with the difficulty of finding inpatient care for the "revolving door" patient who is socially isolated and requires help with:
   a. Addiction
   b. Psychiatric disorders
   c. Underlying physical illness
7. Finding ways to make effective treatment referrals and to ensure an integrated network of care for patients with psychiatric disorders is among the most difficult challenges facing community paramedics.

III. Psychiatric Disorders

A. Behavior

1. Behavior is defined as the way a person acts or responds outwardly—the patient's activities that we can observe.
2. Community paramedics must be careful to not make premature conclusions about their patients' internal life from the external signs they present.
3. It can be difficult to tell, particularly when a person is in crisis, if the cause of abnormal behavior is:
    a. Stress
    b. Medical illness
    c. Use of alcohol or drugs
    d. Psychiatric disorder
4. As experienced emergency medical services (EMS) providers, community paramedics are familiar with the confusion experienced by:
    a. A patient with diabetes whose blood glucose is too low
    b. A patient who has consumed too much alcohol or mind-altering drugs
    c. A patient with Alzheimer disease

B. Psychiatric emergencies

1. The threshold for identifying a psychiatric emergency is based on the level of agitation, violence, or uncooperative behavior that poses a threat to self or others.
2. The safety of any scene can deteriorate rapidly and a patient's condition can change rapidly—certainly from visit to visit.
3. As a community paramedic, you need to be alert to the signs of imminent behavioral change, even violence.

C. Chronic psychiatric disorders

1. Chronic psychiatric disorders tend to persist over a long period—in some cases, for the entire life span of the patient.
2. Although most psychiatric disorders have the potential to become chronic, the chronic psychiatric disorders that community paramedics are most likely to encounter include:
    a. Schizophrenia
    b. Major depressive disorder
    c. Bipolar disorder
    d. Obsessive-compulsive disorder (OCD)
3. A patient's chronic psychiatric disorder may not be evident or present all the time.
4. Treatment options for the patient with a chronic psychiatric disorder may not be readily available because of:
    a. Lack of resources
    b. Prohibitive cost

c. Lack of accessibility
d. Limited program capacity

IV. Classifying Psychiatric Disorders

A. *Diagnostic and Statistical Manual of Mental Disorders*

1. We classify psychiatric disorders based on definitions of the signs and symptoms of abnormal conditions. These definitions are continually tested, debated, and revised through scientific research to incorporate new evidence.
2. The result of this effort is the *Diagnostic and Statistical Manual of Mental Disorders (DSM),* now in its fifth edition (*DSM-5*).
3. This nearly 1,000-page compendium published by the American Psychiatric Association lists, in common language, all psychiatric disorders, along with:
   a. Symptoms
   b. Descriptions of the psychiatric disorder
   c. Criteria for diagnosis
4. *DSM-5* addresses common features of some psychiatric disorders—cross-cutting symptoms, or symptoms that may not fit neatly into a single diagnosis, but "cut across" several psychiatric disorders.
   a. Diagnostic categories are created solely for the convenience of health care providers.
   b. Knowing the patient as a person is more important than checking off the boxes of a diagnosis or fitting that person into a category.

V. Medical Versus Mental Causes of Psychiatric Symptoms

A. Causes of psychiatric symptoms

1. Signs and symptoms that appear to signify psychiatric disorders, such as hallucinations, may sometimes be the result of a medical condition.
2. Because the physiologic effects of medical diseases can produce or mimic psychiatric disorders, it is important to treat the whole person—mind *and* body—rather than simply assuming the problem stems only from the patient's mind.
3. Start by taking a thorough medical history and performing a physical examination of the patient.
   a. Recognize that a psychiatric disorder may be nonsymptomatic at the time of the first patient assessment, as some psychiatric disorders develop slowly over time.
   b. During the interview, ask the patient about psychiatric disorders and any past treatment.
4. Signs and symptoms that imply an emergent medical condition as the primary driver of a psychiatric disorder and require activation of EMS for rapid transport include:

a. Loss of memory
b. Severe headache
c. Muscle weakness
d. Heat intolerance
e. Sudden-onset psychosis
f. Abnormal vital signs
g. Slurred speech
h. Seizures

5. You should suspect a medical cause if there has been a rapid onset of memory loss and psychosis.

VI. Safety Concerns

A. Assessment for violence

1. Most patients with psychiatric disorders are not violent. The lifetime prevalence of violence among people with serious psychiatric disorders is 16% compared with 7% for people who do not have a psychiatric disorder.
2. Substance abuse, by contrast, can greatly increase patients' propensity for violence.
3. Predictors of violence include:
   a. A past history of violent behavior (most reliable)
   b. A history of childhood abuse
   c. Borderline or antisocial personality disorder
   d. Substance abuse
   e. Factors such as young age, male sex, and lower socioeconomic status
4. Violent outbursts often follow a recognizable pattern of warning signs:
   a. Fixed, staring facial expression
   b. Clenched jaw or fists
   c. Rigid and tense posture
   d. Loud, threatening speech
   e. Escalating verbal profanity
   f. Motor hyperactivity (usually restless pacing)
5. Aggressive motor activity is a red flag for impending violence and requires immediate intervention and management. Follow local protocols.
6. To reduce the likelihood of violence, the community paramedic should:
   a. Take the time to create an atmosphere of safety
   b. Extend respect to the patient
   c. Establish trust

B. Assessment for suicide risk

1. Demographics
   a. Suicide is a major health problem, representing the 10th leading cause of death in the United States in 2013.
   b. In that year, 41,149 suicides occurred in the United States—a rate of 12.6 deaths per 100,000 people, equivalent to 113 suicides each day.
2. Risk factors for suicide
   a. Several risk factors stand out across the major mental disorders including:
      i. History of attempts
      ii. Seriousness of previous attempts
      iii. Suicidal ideation
   b. Additional risk factors include:
      i. Chronic deteriorating medical illness
      ii. Inability to maintain a job
      iii. Feelings of worthlessness
      iv. Recent onset of impulsive behavior
3. Approaches to suicide assessments for patients with psychiatric disorders
   a. The following practices can potentially improve the quality of your assessment and treatment of people at risk of suicide:
      i. Suspend moral judgment.
      ii. Establish trust.
      iii. Talk openly, frankly, and objectively with the patient about this topic.
      iv. Stay on topic.
      v. Be aware of psychiatric disorders where suicide risks feature in the diagnostic criteria of the disorder.
      vi. Offer assistance.

C. Substance abuse

1. Substance abuse (also called chemical dependency) is the medical terminology used to describe the use of psychoactive (mind-altering) substances that results in a physical or psychological addiction, accompanied by recurrent and significant consequences.
2. Community paramedics may encounter patients with a dual diagnosis, meaning the presence of both a substance abuse disorder and an underlying psychiatric disorder.
3. Virtually all health professionals agree that alcohol and drug abuse and dependency must be treated first. Therapies and interventions must wait until successful completion of chemical dependency treatment.

D. Assessment of substance abuse

1. Wait to assess the patient until he or she is sober, while closely monitoring the patient's medical symptoms.

2. If the patient's mental status is altered at time of assessment, the community paramedic should:
    a. Arrange for transport to a detoxification facility or emergency department for medical assessment
    b. Reschedule the patient assessment for another home visit
3. As part of the patient assessment, obtain a complete alcohol and drug history, including:
    a. The type of substance(s) used
    b. How long the patient has been using them
    c. Previous hospitalizations for substance-related conditions
    d. Consequences of use (eg, physical, personal relationships, employment, and legal issues)
    e. Any prior treatments or periods of abstinence
4. Tests to determine if substance abuse is a problem:
    a. CAFE test
    b. Alcohol Use Disorders Identification Test (AUDIT)

E. Discussing treatment

1. Referring the patient who is substance dependent to seek help or treatment is an art because patients with patterns of substance abuse become skilled at:
    a. Minimalization
    b. Rationalization
    c. Projection (blaming others)
2. The community paramedic can:
    a. Appeal to a desire to recover even if the patient may have failed in previous attempts at sobriety
    b. Reaffirm the patient's worth and ability to recover can help to reduce denial
    c. Challenge the patient by using the patient's own input about how he or she sees the problem or may have described it in the past
    d. Give encouraging feedback
    e. Explain that participation in treatment is the patient's responsibility, but the patient is not responsible for the disease
3. Some programs have open meetings or beginners' groups that welcome people seeking an introduction to the recovery model of the 12-step program.
    a. Alcoholics Anonymous (AA)
    b. Narcotics Anonymous (NA)
4. Success in moving a patient toward therapy for addiction can be a trial-and-error process.
5. Success requires:
    a. A degree of motivation on the part of the patient
    b. An umbrella of safety from the counselor or therapist

c. Good timing to exploit opportunistic moments when the patient is compelled—or legally ordered—to seek treatment

VII. Psychosis

A. Primary versus secondary psychosis

1. Community paramedics may encounter a patient with psychosis at any time:
   a. On a routine visit for follow-up care
   b. At time of first patient encounter
   c. As needed to meet the waxing and waning needs of a patient with a major psychiatric disorder
2. The cause may be an underlying medical condition, such as a:
   a. Urinary tract infection
   b. Medication side effect
   c. Primary psychosis from a psychiatric disorder, such as schizophrenia, bipolar disorder, or a major depressive disorder
3. The general meaning of psychosis is impaired reality testing, which means that the patient is unable to clearly distinguish external reality from his or her own internal reality.
4. Primary psychosis is a serious psychiatric disorder that is characterized by impaired thinking and emotions that cause the patient to lose contact with external reality.
   a. The patient may exhibit delusions or thoughts that are blatantly false or experience auditory, visual, tactile, olfactory, or gustatory hallucinations.
5. Psychotic states may, but do not always, manifest as:
   a. Disorganized speech
   b. A heightened level of agitation
   c. Paranoia
6. One of the most significant of these psychotic disorders is schizophrenia.
7. Secondary psychosis refers to psychotic features caused by:
   a. Medical illness
   b. Substance abuse
   c. Medications
8. In these cases, the patient may not necessarily have an underlying psychiatric condition.
9. The following guidelines may help distinguish psychosis arising from a medical condition or pharmacologic influence from that arising from an underlying psychiatric disorder:
   a. The patient has an underlying medical condition previously diagnosed that is currently symptomatic.

   b. There is a proximal time relationship between the medical condition, recent onset, exacerbation or remission, and psychotic symptoms.
   c. The signs and symptoms of the psychosis are atypical (eg, unusual for a patient of this age, atypical olfactory hallucination).
10. Seek direction from your medical director if your patient presents with psychotic symptoms.

B. Schizophrenia

1. The cause of schizophrenia remains largely unknown.
2. It usually manifests prior to age 25 years (range of onset is 16 to 30 years of age) and persists for the rest of the person's life.
3. Development of schizophrenia may be affected by:
   a. Genetics
   b. Environment
   c. Neurotransmitters
4. There is no single marker, such as a blood test, that identifies schizophrenia; rather, this disorder presents with a broad clinical picture.
5. Diagnosis
   a. The *DSM-5* criteria require that the person experience two or more of the following five symptoms for at least 1 month to warrant a diagnosis of schizophrenia:
      i. Delusions
      ii. Hallucinations
      iii. Disorganized speech
      iv. Disorganized or unresponsive behavior
      v. Negative symptoms (eg, flat affect, decreased motivation)
   b. Other factors considered in the diagnosis include deterioration of ability to maintain:
      i. A job
      ii. Interpersonal relationships
      iii. Self-care
   c. At the center of the symptoms of schizophrenia is distorted reality testing that is worsened by periods of delusions and hallucinations.
6. Therapeutic interventions
   a. Treatment of schizophrenia is frequently viewed as consisting of three phases:
      i. Acute
      ii. Stabilization
      iii. Maintenance
   b. Ruling out suicide risk in the acute phase is crucial.
   c. Medication therapy remains the cornerstone of schizophrenia management throughout the course of treatment.

d. Combining medication therapy with psychosocial therapy helps prevent relapses.
e. Coordinated specialty care (CSC) has been shown to improve treatment outcomes for young people with early-stage psychosis.
f. First-generation antipsychotics (now called typical antipsychotics)
    i. Still used to treat schizophrenia
    ii. Effectiveness is debated
    iii. Compliance rates as low as 30%
    iv. Extrapyramidal symptoms
    vi. Tardive dyskinesia
g. Second-generation antipsychotics (now called atypical antipsychotics)
    i. May show modest benefit over first-generation medications
    ii. Fewer extrapyramidal side effects
    iii. Risk of weight gain unacceptable in cases
h. Community paramedics should monitor and keep a record of adverse effects from schizophrenia medications, such as:
    i. Sedation
    ii. Sleep difficulties
    iii. Sexual and reproductive system problems
    iv. Extrapyramidal symptoms
    v. Weight change
    vi. Abnormalities in blood pressure
    vii. Changes in blood lipid and glucose levels

7. Remission and recovery
    a. Although schizophrenia is not curable and relapse rates are high, patients do experience periods, sometimes long periods, of remission or improvement.
    b. Relapse rates remain high—up to 82% after 5 years.
    c. Discontinuing medication is associated with a five times higher risk of relapse as compared with staying on medication.
    d. Ongoing psychosocial assessment is important for all patients with schizophrenia.
    e. When appropriate and if available, enlist concerned family members in the assessment and care of the patient.

C. Bipolar disorder

1. Bipolar disorder is an example of how our understanding of a psychiatric disorder can change over time.
2. This disease was formerly called “manic-depressive disorder,” a term that implied the patient experienced periods of exuberant, euphoric hyperactivity and racing thoughts (manic episodes), which were then routinely followed by down periods

of depressed mood, lack of interest in activities, and thoughts about death (depressive episodes).

3. In reality, patients may have numerous periods of major depression before the first episode of mania occurs.
   a. Moods can cycle in highly variable ways in frequency and severity.
4. Bipolar disorder is the sixth leading cause of disability in the developed world in people 15 to 44 years of age.
5. Bipolar disorder is frequently associated with other coexisting conditions, most commonly anxiety disorders and substance abuse disorders.
6. In addition many common medical illnesses can cause or influence the symptoms of bipolar disorder.
7. It is vital to assess the patient with bipolar disorder for risk of harming self or others.
8. Types of bipolar disorder
   a. Bipolar disorder can be confusing because the disorder is divided into two distinctly separate illnesses:
      i. Bipolar I
      ii. Bipolar II
   b. Bipolar I is roughly equivalent to the historical definition of manic-depressive illness, placing an emphasis on episodes of severe mania followed by depression.
   c. Bipolar II requires at least one major depressive episode and hypomania (a lesser degree of mania), but emphasizes impairment in work and social functioning caused by the depression.
   d. Depending on the community paramedicine program, the goal for community paramedics when assessing a patient with suspected bipolar disorder is to look for core symptoms of both disorders and generally judge which aspect of bipolar disorder is causing the patient greatest harm.
   e. The community paramedic should seek direction for an appropriate referral to the emergency department or psychiatric consultant in accordance with local protocols.
9. Therapeutic interventions
   a. The primary role for the community paramedic working with a patient with bipolar disorder may be:
      i. Monitoring medication compliance
      ii. Monitoring potential substance abuse
      iii. Helping to ensure adherence to the patient's psychotherapy treatment plan
   b. A first priority for patients with bipolar disorder is an assessment for substance abuse and dependency.
   c. Patients can achieve greater control over mood swings through a combination of medications and psychotherapy.

d. Mood stabilizers are the first choice for treatment. Most commonly used is lithium.
e. Because bipolar disorder is a complicated disease, other medications are brought into the treatment protocol as necessary to treat psychotic and depressive symptoms.
f. Patient education and counseling, including psychotherapy and cognitive-behavioral therapy (CBT), are typically added as components to treatment after initial stabilization.
g. A relatively new protocol, interpersonal and social rhythm therapy (IPSRT), seeks to help patients stabilize routines for sleep, mealtimes, and exercise.

VIII. Depressive Disorders

A. Depression

1. Depression is a disorder of mood characterized by:
   a. Extreme sadness
   b. Irritability
   c. Loss of the ability to experience pleasure
2. It is accompanied by fatigue and disturbances of:
   a. Sleep
   b. Appetite
   c. Sexual desire
3. The primary emotion experienced by persons with depression is profound sadness.
4. There may be no external reason for the feelings of profound sadness.

B. Depression in the older population

1. Depression can occur later in life even in people who have not previously experienced a depressive episode.
2. Major depressive disorder occurs in 5% of adults older than 60 years, and as many as 16% of these adults have clinically significant depressive symptoms.
3. Rates of the disorder rise with the presence of coexisting medical conditions and increase dramatically after hospitalizations.
4. Community paramedics may need to refer an older patient for assessment of cognitive deficits that can, by themselves, increase levels of clinical depression.
5. The challenge with older patients is to assess the impact of coexisting illnesses.
6. While suicide assessment is important for all older patients, the risk in this population warrants greater attention and precaution.
7. The community paramedic should look for changes in normal patterns and closely monitor the older patient's:
   a. Pattern of social activities

b. Eating patterns
c. Level of worry
d. Sleep habits
e. Complaints

C. Therapeutic interventions

1. Depending on the community paramedicine program, community paramedics may:
   a. Monitor medication compliance
   b. Monitor adherence to psychotherapy treatment plans
   c. Act as a source of support and encouragement to the patient
2. Two modalities of treatment have produced positive results and continue to be cost-effective:
   a. Antidepressant medications
   b. Cognitive-behavioral therapy (CBT)
3. Antidepressants
   a. Antidepressants remain the first-line pharmacologic treatments for patients with depression.
   b. The community paramedic needs to make sure patients know what to expect in terms of response to medication and potential side effects and that they know how to manage the start or discontinuation of medications.
   c. Importantly, suicide is a risk with antidepressants both at the start and upon discontinuation of use.
   d. One notable risk associated with the major selective serotonin reuptake inhibitor (SSRI) antidepressants (eg, citalopram, sertraline, fluoxetine, and escitalopram) is serotonin syndrome, a serious and potentially fatal condition that is caused by too much serotonin in the neuronal synapse of the brain stem and spinal cord.
4. Cognitive-behavioral therapy
   a. The concept of American psychiatrist Aaron Beck of the University of Pennsylvania, this therapy is based on the idea that changing the way a patient thinks can change the way a patient feels and, therefore, the way the patient responds.
   b. When undergoing CBT, the patient works with a mental health counselor (psychotherapist or therapist) in a structured way, attending a limited number of sessions.
   c. CBT can be a very helpful tool in treating a variety of psychiatric disorders, such as:
      i. Depression
      ii. Posttraumatic stress disorder
      iii. Eating disorders

d. CBT can also be an effective and affordable tool to help anyone learn how to better manage stressful life situations.

5. Electroconvulsive therapy
   a. Developed in 1938, electroconvulsive therapy (ECT) is the oldest form of brain stimulation therapy and has an infamous reputation in popular culture.
   b. It is often an effective treatment for depression that has resisted antidepressant medications and other forms of therapy.
   c. Following careful medical screening and in a highly controlled environment, low-energy electrical current is passed through the brain to cause a seizure lasting 1 minute.
   d. Common side effects include:
      i. Short-term confusion
      ii. Headaches
      iii. Muscle ache
      iv. Nausea
      v. Temporary memory loss
   e. ECT has been reported to result in a prompt improvement in symptoms of depression in the majority of patients treated.
   f. It is not clear how ECT achieves its therapeutic success, but the procedure is considered safe and the patient response is rapid.
   g. Usually, patients receive treatment 2 or 3 times per week in a series of 6 to 12 treatments.
   h. The major drawback of ECT is its relatively high cost.
6. Repetitive transcranial magnetic stimulation (rTMS)
   a. An electromagnetic coil is held against the forehead and short electromagnetic pulses are administered via the coil.
   b. This treatment for depression is relatively new, and response rates and side effects are the focus of ongoing research.
   c. Patients report headaches and sensitivity at the side of the head where the magnet was placed, but we do not yet know the long-term effects.

IX. Anxiety Disorders

A. Anxiety

1. For some people the feeling of fear can become excessive, evolving into a paralyzing dread about some future threat—in other words, anxiety.
2. When anxiety becomes irrational and difficult to control, it is considered a psychiatric pathology if it meets specific diagnostic criteria.
3. Among the many important changes in *DSM-5*, the types of anxiety disorders and their essential features were reclassified.

B. Generalized anxiety disorder

1. At the core of generalized anxiety disorder (GAD) is chronic and persistent worry—fretfulness that typically centers on numerous issues (eg, work, finances, health).
2. Patients with GAD have a number of common presenting attributes:
   a. The worry is uncontrollable and is consistently present for 6 months.
   b. The disorder is often associated with depression, alcohol abuse, and substance abuse.
   c. It frequently presents with multiple but often nonspecific symptoms of physical health (eg, back pain, headaches, gastrointestinal problems, insomnia).
3. Anxiety disorders commonly co-occur with alcohol or drug abuse, which can either mask the symptoms of anxiety or amplify them.
4. During the patient assessment, look for signs and symptoms of depression and posttraumatic stress disorder.
5. Patients should be evaluated for GAD by a mental health professional if they have at least three of the following symptoms:
   a. Restlessness or a feeling of being keyed up or "on edge"
   b. Fatigue
   c. Difficulty concentrating
   d. Irritability
   e. Muscle tension
   f. Sleep disturbance

C. Phobic disorders

1. Phobic disorders are characterized by excessive and irrational fears.
2. Examples:
   a. Agoraphobia (overwhelming fear triggered by being outside)
   b. Social phobia (fear of scrutiny by others, particularly peers)
   c. Specific phobia (marked fear or anxiety about a specific object or situation)
3. It is common for patients with this disorder to have multiple specific phobias.
4. It is helpful in crafting treatment to determine if the specific phobia is tied to a traumatic event.

D. Therapeutic interventions

1. Depending on the community paramedicine program, the role of the community paramedic may involve:
   a. Monitoring medication
   b. Medication compliance
   c. Adherence to psychiatric treatment plans

2. The community paramedic may also educate the patient on the need to keep regular therapy appointments.
3. Psychotherapy (primarily CBT) and pharmacotherapy are the modalities most frequently used to treat anxiety disorders.

X. Obsessive-Compulsive Disorder

A. OCD is a psychiatric disorder that is frequently misunderstood by the public.

1. It was previously viewed as an anxiety or personality disorder, but is better classified as a neuropsychiatric disorder.
   a. Hoarding disorder, for example, is a closely related disorder.
2. Patients with OCD exhibit:
   a. Obsessions (repetitive, intrusive thoughts)
   b. Compulsions (repetitive, ritualistic behaviors)
3. Not surprisingly, then OCD has a high comorbidity with depression.
4. Physical and sexual abuse and other traumatic stress have also been associated with OCD.
5. The cause of OCD is poorly understood. Some studies of brain structures have found cognitive deficits and hyperactivity in frontal lobe functions.
6. Exposure-and-response therapy and CBT are the most effective treatments for OCD.

XI. Posttraumatic Stress Disorder

A. Diagnosis

1. Posttraumatic stress disorder (PTSD) is enormously complex, with dimensions of:
   a. Anxiety
   b. Depression
   c. Dissociation (disconnection from self)
   d. Sleep disturbance
   e. Memory impairment
2. The patient with PTSD commonly reexperiences the event with intrusive recollections, replays, and distressing memories that usually include sensory, emotional, and physiologic behavioral components.
3. How and why PTSD develops in patients is not clearly understood.

B. Therapeutic interventions

1. The community paramedic may:
   a. Monitor the patient for medication compliance and compliance with psychiatric treatment plans

   b. Assist in navigating the patient to stable living conditions and a safe physical environment
   c. Monitor the patient's physical health and risk of suicide
2. The community paramedic may navigate the patient to outreach services such as Veterans Affairs or local support groups to help address issues of:
   a. Pain management
   b. Substance abuse
   c. Housing
   d. Employment
3. In general, the following treatments have withstood greater scrutiny, though their effectiveness varies across most patient populations:
   a. Exposure therapy
      i. Most forms use a therapist-guided recall of traumatic memories in a controlled fashion so the patient can regain mastery of his or her thoughts and feelings about the incident.
      ii. The aim is to help the patient evaluate and safely return to activities he or she has previously avoided.
   b. CBT
      i. CBT is frequently used in concert with exposure therapy.
      ii. CBT revises the patient's thinking pattern and automatic responses.
   c. Stress-inoculation therapy
      i. This hybrid treatment combines elements of CBT with specific techniques of anxiety reduction, breathing, muscle relaxation, and memory recall.
   d. Eye-movement desensitization and reprocessing (EMDR)
      i. This treatment combines exposure therapy with a series of guided eye movements.
      ii. It is not clear how EDMR works, but it has shown favorable results in treating PTSD.
   e. Medications
      i. Both antidepressants and antianxiety medications are often used to treat patients with PTSD.
      ii. In addition, prazosin (Minipress) is sometimes used to suppress nightmares.
   f. Psychotherapy
      i. Individual and group psychotherapy are frequently used to treat patients with PTSD.
   g. Service animals
      i. Recent trials utilizing service animals to reduce anxiety and calm night terrors have shown promise.

XII. Building a Relationship: The Essentials

A. Personal style of dealing with people

1. An integral part of the treatment of patients with psychiatric disorders is the community paramedic's personal style of dealing with other people.
   a. Manner of speech
   b. Values
   c. Beliefs
   d. Ability to listen
2. It is vital to suspend any judgment of the patient and provide the patient with a sense of emotional safety.
3. To help establish trust with the patient, the community paramedic can use a number of techniques, including maintaining cultural sensitivity.
4. In addition, the community paramedic should give respect and make a concerted effort to earn the patient's trust.
   a. The patient will easily recognize when a community paramedic is genuinely compassionate and views him or her as a human being.
   b. Take your time; trust evolves over the course of your relationship with the patient.
5. Listen actively, and respond rather than react.
   a. Focus on what the patient is saying, and respond by paraphrasing his or her words and stating your understanding of his or her emotions.
   b. Above all, do not offer solutions and give advice.
   c. Use positive body language and cues.
   d. Use direct eye contact.
   e. Set limits.
   f. Maintain professional boundaries.

XIII. Referrals

A. Psychiatry or psychology?

1. The difference between psychiatric and psychological disorders is in many ways established by the means used to treat the disorder—that is, between treatment based on "pills" and treatment featuring "skills."
2. The most successful programs incorporate counselors who also address a broad spectrum of:
   a. Medication therapy
   b. Individual and family therapy
   c. Substance abuse treatment
   d. Vocational, housing, educational, social, and nutritional needs

B. Referrals

1. As a community paramedic, you will meet with the patient alone, yet many patients with serious psychiatric disorders require additional resources.
2. While the medical director or the patient's primary care physician will determine to whom the patient will be referred, as a community paramedic, you may be an advocate for the patient.
    a. Discuss the patient with the medical director.
3. The patient may be referred to the following professionals:
    a. Medical doctors (MD or DO), including psychiatrists
    b. Psychologists (PhD, PsyD, or MA)
    c. Clinical social workers
    d. Psychiatric mental health nurses
    e. Marriage and family therapists
    f. Licensed professional counselors (LPCs) and licensed mental health counselors (LMHCs)
    g. Chemical dependency counselors (addiction specialists)
4. As a community paramedic, you may navigate patients to outreach services and assist in navigating the health care system.
5. Being familiar with the specific agencies, clinics, hospitals, and treatment programs in your area—including their availability, accessibility, and cost—is essential.
6. Next, identify who will manage the case, especially after the referral is made.
7. Finally, follow up on the referral.

Post-Lecture

Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (**date to be determined by instructor**).

B. Read Chapter 17, "Communication Strategies for Children With Special Needs," for the next class session.

Chapter 17
Communication Strategies for Children with Special Needs

Unit Summary

After students complete this chapter and the related course work, they will be able to describe the principles of patient- and family-centered care in the community paramedicine setting, identify four types of developmental delays and four types of communication disorders in children, identify common motor and movement disorders in children, describe autism spectrum disorder and Down syndrome, and identify specific strategies for communicating with children with communications disorders, autism spectrum disorder, and Down syndrome. Additionally, the students will be able to describe the types of technologies that may be used in providing in-home care for children with special health care needs.

Objectives

1. Describe the principles of patient- and family-centered care in the community paramedicine setting. (p 309)
2. Name the four types of developmental delays in children. (p 310)
3. Describe common communication disorders in children. (p 310)
4. Identify common motor and movement disorders in children. (p 310)
5. Describe the signs and characteristics of autism spectrum disorder. (pp 310-311)
6. Describe the signs and characteristics of Down syndrome. (p 311)
7. Describe the general strategies for the community paramedic in communicating with children with special health care needs, including using people-first language. (pp 311-314)
8. Identify specific strategies for communicating with children with communication disorders. (p 314)
9. Identify specific strategies for communicating with children with autism spectrum disorder. (pp 314-315)
10. Identify specific strategies for communicating with children with Down syndrome. (pp 315-316)
11. Identify specific strategies for communicating with children with physical and physiologic barriers to communication. (pp 316-317)
12. Describe the types of technologies that may be used in providing in-home care for children with special health needs. (pp 317-318)

Readings and Preparation

- Review all instructional materials including ***Community Health Paramedicine***, Chapter 17, and all related presentation support materials.
- Review local protocols relating to the principles of patient- and family-centered care in the community paramedic setting, caring for children with developmental delays, common communication disorders, and common motor and movement disorders, specific strategies for communicating with children with communication disorders, autism spectrum disorder, and Down syndrome, and using the types of technologies that are used in providing in-home care for children with special health care needs.

Support Materials

- Lecture PowerPoint presentation

Enhancements

- Direct students to visit Navigate 2.
- Provide copies of local protocols.

Unit Activities

Writing assignments: Instruct each student to put together a scenario for children with special health care needs.

Student presentations: Divide students into groups. Instruct each group to act out the scenario for children with special health care needs (developed for the writing assignment) for the rest of the class.

Group activities: Discuss and critique each student presentation as a group. Discuss problems regarding common communication disorders in children, common motor and movement disorders in children, autism spectrum disorder, and Down syndrome. Describe the general strategies for the community paramedic in communicating with children with special health care needs, including using people-first language.

Pre-Lecture

You are the Community Paramedic

"You are the Community Paramedic" is an opening case study that encourages critical thinking skills.

Instructor Directions

1. Direct students to read the "You are the Community Paramedic" scenario found a the beginning of Chapter 17.
2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question.
3. You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. Children with special health care needs

1. More than 11 million children younger than 18 years of age in the United States are classified as having special health care needs.
   a. Such conditions affect 23% of US households with children.
   b. The federal Maternal and Child Health Bureau defines children with special health care needs as children with chronic physical, developmental, behavioral, or emotional conditions who require special services (eg, health care, educational resources, and behavioral therapy).
2. Because a child with special health care needs may require unique and/or frequent health and related services, he or she may benefit from:
   a. In-home follow-up
   b. Preventive care services
      i. Depending on the community paramedicine program, the community paramedic may be called to provide these services.
3. Central to every patient encounter are the principles of:
   a. Patient- and family-centered care
   b. Good communication skills
4. Significant challenges to communication include:
   a. Physical, developmental, and behavioral conditions
   b. Common health care provider misperceptions and misunderstandings

II. The Community Paramedic's Role in Caring for Children with Special Needs

A. The pediatric care niche

1. In the prehospital emergency setting, emergency medical services providers and community paramedics may have limited experience with children who have special health care needs.
2. As community paramedicine continues to evolve, pediatric care is beginning to form a distinct niche within this field.
   a. Demonstration project at Indiana University (funded by an Emergency Medical Services for Children Targeted Issues grant)
   b. Milwaukee, WI: Community paramedics trained to identify and address risks to infants in the home to reduce infant mortality
3. Follow-up and preventive care for asthma is emerging as an example of a specific, evidence-based community paramedicine intervention.
4. A specific role for community paramedicine in caring for issues directly related to chronic physical, developmental, behavioral, or emotional conditions in the pediatric population has yet to be defined.
   a. In general, a primary care physician develops the plan of care for patients with such chronic conditions, and the community paramedic's role is limited to the monitor-manage-educate triad of responsibilities.

III. Developmental Milestones

A. Child development

1. Childhood development varies according to a combination of factors, including:
   a. Genetics
   b. Environment
2. Developmental milestones may be measured in terms of:
   a. Gross motor skills
   b. Fine motor skills
   c. Communication and language development
   d. Cognitive maturity
3. The best way to understand the functional level of any child is to ask the parent/caretaker.
   a. Ask at which age or grade level the child functions or how the child expresses basic emotions such as pain or fear.
   b. Ask the best way to approach the child and which techniques can be used to mitigate the child's potential anxiety of working with an unfamiliar person.

B. Developmental delays

1. Developmental delay refers to the situation in which a child does not reach specific developmental milestones by an expected age.
2. Four main areas are subject to developmental delays:
   a. Speech or language development includes the ability to communicate effectively with others, including both receptive and expressive language.
   b. Motor development includes the ability to balance, walk, use the hands or fingers, and demonstrate eye–hand coordination.
   c. Social and emotional development includes the ability to have meaningful relationships with others, interact with others, and pick up on social cues.
   d. Cognitive development includes thinking skills, learning, reasoning, and memory skills.

C. Communication disorders

1. Communication disorders encompass a wide array of problems in:
   a. Language
   b. Speech
   c. Hearing
2. Conditions due to a wide variety of factors:
   a. Disfluency (stuttering and other disruptions in speech flow)
   b. Aphasia (difficulty using words)
   c. Delays in speech and language development
3. Conditions associated with communication disorders:
   a. Cerebral palsy
   b. Deafness
   c. Anatomic abnormalities such as cleft lip or cleft palate
4. The first 3 years of life are the most critical for acquiring speech and language skills.
   a. By the first grade, approximately 5% of children have noticeable speech disorders, including:
      i. Stuttering
      ii. Speech sound disorders
      iii. Dysarthria (difficult or unclear speech articulation)
   b. Children with special health care needs who have communication deficits may develop their own type of sign language to communicate.

D. Motor and movement disorders

1. Motor and movement disorders are often recognized at the infant and toddler stages of development, when a child is unable to perform age-appropriate skills such as:
   a. Walking

   b. Catching a ball
   c. Playing sports
2. The most common cause of motor disorders in children is cerebral palsy.
   a. Cerebral palsy: umbrella term for a group of neurologic disorders that impact muscle coordination due to dysfunction of the part of the brain that controls muscle movements
   b. Most children with cerebral palsy are born with it, but it may not be diagnosed until they are at the infant or toddler stages of development.

E. Autism spectrum disorder

1. Autism spectrum disorder (ASD), more commonly called autism, is a neurobiologic spectrum disorder that encompasses a range of complex neurodevelopmental disorders.
   a. Occurs in all ethnic and socioeconomic groups
   b. Affects every age group
   c. Boys are 4.5 times more likely than girls to be diagnosed with the disorder.
2. There are many hallmark signs and characteristics of ASD, yet each person with ASD is completely different.
3. Each person with ASD also has his or her own special behaviors and specific interventions that can assist the community paramedic with managing those behaviors and traits.
4. Many people with ASD demonstrate difficulty with:
   a. Social interactions/relationships and social thinking (ie, viewing situations from another person's perspective)
   b. Children with ASD may have challenges in interacting with and playing with their peers.
5. Some people with ASD are unable to interpret all or some forms of sensory input and may exhibit reactions that are either overresponsive or underresponsive to sensory stimuli.
   a. Difficulties with interpreting and responding to sensory input may manifest in a person's behaviors. Such behaviors may include repetitive movements such as:
      i. Rocking
      ii. Hand-flapping
      iii. Twirling
      iv. Vocal sounds
   b. Overstimulation manifests in some people with ASD as self-injurious behaviors such as:
      i. Biting
      ii. Head-banging
6. Every person with ASD is unique. It is important to ask caregivers for guidance on the best way to approach a patient with ASD.

a. Caregivers can be useful in:
   i. Performing physical examinations
   ii. Assisting with medication administration
b. Caregivers should always be engaged when working with patients if the community paramedic is unfamiliar with the patient or unsure of how to approach him or her.

F. Down syndrome

1. Down syndrome is an inherited genetic disorder that is responsible for:
   a. Developmental delay
   b. Cognitive impairment
   c. A pattern of unusual physical features
2. Patients can be identified visually from certain telltale features of the person's head, face, and neck.
3. Features include:
   a. Flattened face and nose
   b. Short neck
   c. Upward-slanting eyes
   d. Protruding tongue
   e. Single crease noted on the palms of the patient's hands
4. Down syndrome is also known as trisomy 21.
   a. Normal human cells have 23 pairs of chromosomes that create the cell's genetic identity.
   b. In Down syndrome, an extra chromosome attaches to the 21st pair, becoming the third chromosome 21 or trisomy 21.
5. Chromosomal changes associated with Down syndrome may cause:
   a. Structural heart defects
   b. Seizures
   c. Numerous gastrointestinal problems
   d. Speech alterations
   e. Hearing loss
   f. Other abnormalities
6. Persons with Down syndrome also have a shorter life expectancy.
7. Depending on their level of mental disability, persons with Down syndrome may:
   a. Function relatively independently OR
   b. Require constant assistance with even basic tasks

IV. Communicating With Children With Special Health Care Needs

A. Providing effective care

1. A community paramedic may, at any time, be called upon to provide services for children with special health care needs.
2. You do not need to know all of the characteristics of a child's chronic condition.
3. Every health care professional should:
   a. Have an understanding of the communication barriers associated with common social, behavioral, and physiologic conditions
   b. Be prepared with effective strategies to overcome them
4. Keys to providing the most effective care:
   a. Adapting to the child's norms
   b. Keeping him or her at the center of attention
   c. Working with the family and caregivers as a team
5. It is important to embrace the idea that these patients are children first, and effective communication strategies must be tailored to meet these patients' needs.

B. Overcoming general barriers to communication

1. For any pediatric patient encountered by the community paramedic, barriers to effective communication may include:
   a. The child's age and stage of development
   b. Environmental and situational stress or anxiety
   c. Developmental or behavioral disorders
   d. Physical and physiologic barriers
   e. Cultural considerations
   f. Language barriers
2. The goal for the community paramedic is to understand:
   a. The patient's specific stage of development
   b. The barriers to communication
3. Regardless of any special physical, emotional, developmental, or behavioral needs a child may have, effective communication is:
   a. Built upon trust
   b. Founded on the basic concepts of patient and family-centered care
4. The community paramedic can use the following tips to avoid communication breakdowns:
   a. Use one main provider for direct care of the child. Only one person should be asking questions at a time. Avoid performing hands-on care while another person is talking to the child.
   b. Get down to child's eye level.

   c. When possible, talk before touching. Calm and reassure the child before invading his or her space.
   d. Begin a physical examination using only your hands; use tools only after a trusting relationship is built.
   e. Show equipment before using it on the child. Let the child see and touch the device. Elicit the child's "help" in using tools; for example, let the child listen first with the stethoscope or hold the bell over his or her heart while you listen.
   f. Speak in a calm, quiet voice.
   g. Never become impatient. Take a break from the situation if necessary because of frustration.
   h. Offer choices, but only where they exist. Never ask the child's permission to do something that will be done anyway. If the child says no and you do it anyway, all trust is gone. For example, when taking a blood pressure, explain what will happen and offer a choice of which arm to use.
   i. Minimize time between talking about a procedure and doing it. Do not leave supplies in view until it is time to use them.
   j. Involve caregivers. Inform them and integrate them into all decisions and care.
   k. Be honest, using nonthreatening language.
   l. Be gentle and reduce pain when possible.
   m. Encourage, praise, and console the child whenever possible.
5. Identifying each child's unique communication needs can be thought of as a variation on a theme—namely, figuring out what works best and varying communication approaches accordingly.
6. During a physical examination:
   a. Always warn the child before touching him or her, and explain what you are going to do and why.
   b. It may be helpful with some children to demonstrate procedures such as taking a blood pressure reading or listening to lung sounds on a stuffed toy or family member.
   c. Keep needles and other frightening equipment out of sight until just before their use to avoid anticipation anxiety.
   d. Use a calm, even tone of voice, and speak to the child in short, to-the-point language ("Please stand up"). Avoid requests that could result in the child saying no, a response that, if not honored, will quickly erode trust.
7. The community paramedic must always be sensitive to language that can inadvertently diminish trust and derail the communication train.
   a. Never overtly draw a distinction between the child with special health care needs and a "normal" child.
      i. The challenge is to identify each child's norms and adapt communication styles and techniques as needed.

   b. Avoid attempts to fit patients and families into narrow, preconceived ideas of normal.
      i. Never compare a child to other children that are "normal."
   c. Although the meaning is basically the same, "typical" and "neurotypical" are commonly used terms for people who are not on the autism spectrum.
      i. "Typical" may have less of a negative connotation.
8. People-first language is communication approach that encourages providers to think of people with disabilities as people first, rather than by their disability or condition.
   a. It is based on the idea that how the provider talks to or about a child impacts:
      i. The provider's ability to communicate effectively with the child
      ii. How the provider thinks about the child as an individual
      iii. How the provider treats the child as a patient
   b. Example: "Billy is autistic" would be better phrased as "Billy has autism." Autism is something Billy has, not something he is.
9. Another common communication pitfall when caring for children with special health care needs is talking *about* the patient but not *to* the patient.
   a. The provider speaks directly to the parents or caregivers either because the child is unable to communicate or because there is a misperception about the child's cognitive or communicative abilities.
   b. Failure to directly acknowledge the child can be demeaning to both the child and the parent and will diminish trust.
10. To avoid this communication barrier, the community paramedic should keep the child at the center of attention, even when it is necessary to get answers from the parent or caregiver.
   a. Always direct questions and instructions to the child first.
   b. Many children with special health care needs are very knowledgeable about their condition, including their:
      i. Health history
      ii. Medications
      iii. Special equipment
   c. Involving them directly in their care will help achieve cooperation and compliance.
11. As part of family-centered care, the community paramedic should also encourage the child's caregivers to participate in all aspects of planning and care.
   a. Remember that they are "experts" when it comes to their child.
      i. They know how the child communicates
      ii. They can advise the community paramedic how best to approach the child, how to ask questions, and how to avoid stress triggers.

C. Overcoming barriers related to communication disorders

1. Many children with chronic physical, developmental, behavioral, or emotional conditions exhibit one or more speech disorders such as:
   a. Disfluency
   b. Aphasia
   c. Dysarthria
2. These conditions are often exacerbated when the child is stressed or anxious, such as during the patient assessment.
3. Following the basic principles of effective, patient and family-centered communication techniques will help reduce the patient's anxieties and minimize speech-related complications.
4. Communication tips to help care for children with speech disorders
   a. Minimize background noise.
   b. Get the child's attention before speaking, and speak in a normal voice.
   c. Pay attention and watch as the child speaks; do not try to listen while doing something else.
   d. Slow your rate of speech. It may help to pause before responding or asking the next question to slow down the pace of the conversation.
   e. Allow the child sufficient time to speak; avoid finishing sentences or offering words.
   f. Avoid suggestions like "slow down" or "relax."
   g. Use simple sentences and questions that can be answered with a simple "yes" or "no" when possible.
   h. Let the child know what you understood and what you did not so the entire message does not have to be repeated.
   i. If you still have difficulty understanding, try communicating with drawings or writing or with an augmentative and alternative communication device or computer-aided communication tools such as a computer or tablet device with special apps or a speech-generating device.
   j. Encourage, do not discourage, questions and participation in decision making.

D. Overcoming communication barriers related to ASD

1. ASD is among the most prevalent of the developmental and behavioral disorders, with as many as 1 in 45 children affected in the United States.
   a. Key characteristics of ASD include:
      i. Social impairment
      ii. Communication difficulties
   b. In terms of their communication abilities, children with ASD may fall anywhere along the continuum from entirely nonverbal to fluent.
   c. Children with ASD process information one step at a time and may be unable to process communication-related stimuli quickly, especially when stressed.

   d. The community paramedic should allow the child with ASD extra processing time after asking a question or giving a command.
      i. Acknowledge responses with a "Thank you" or "Great job!", thereby signaling the end of each segment in the communication, and then move on to the next question or instruction.
2. Children with ASD are frequently uncomfortable with eye contact and may avoid it altogether. They may not understand:
   a. Nonverbal cues such as facial expressions or other forms of body language
   b. Social cues
   c. The feelings of others (or be able to express their feelings in a typical way)
3. Sensitivity or reaction to any kind of sensory stimulation (sound, tactile cues, smell, or temperature changes) may be heightened or diminished.
4. It may be helpful to demonstrate the planned intervention on a stuffed animal or a family member to decrease the child's fear and anxiety.
5. Some children may not tolerate oral medications. The community paramedic should work with the family or primary caregiver to help the child with medications; they usually know what works for their child and may be the only ones to whom the child will respond.
6. Sudden, unexpected changes in routine can cause confusion and fear in children with ASD, leading to sensory overload and meltdown, or tantrum.
   a. Withdrawal
   b. Freezing up
   c. Elopement (wandering)
   d. Increased self-stimulation, such as fist-pounding, flapping of the hands, or shouting repetitive phrases in a loud voice
7. If the child becomes aggressive or has a meltdown, the community paramedic should:
   a. Remain calm
   b. Stop talking
   c. Back up and give the child more space
   d. Open your palms and place your arms by your sides
   e. Allow the situation to play out
   f. Speak in a low voice, and be reassuring and nonthreatening
8. Communication tips to help care for children with ASD
   a. Speak to the child in a strong, calm voice. Don't assume that a child with autism is not listening or does not understand if he or she does not answer. Give these children extra time to process each question or instruction before moving to the next. Do not continually repeat questions, as this may cause the processing to start all over again each time and may aggravate the child.
   b. Provide careful, sequential, descriptive explanations for your actions, and be literal. Give instructions and tasks one at a time.

c. If the child becomes agitated or experiences a meltdown, ask for help from the parents or caregivers and remove any upsetting stimuli.
d. Unless immediate life threats (eg, uncontrolled bleeding) must be addressed, allow a little extra time to establish rapport and to provide the child with enough time to engage his or her self-stimulating coping behaviors to restore the child's sense of control.
e. Encourage nonharmful routines such as pacing, hand-flapping, or excessive rocking. Self-stimulation is an important coping mechanism for many children with ASD, and attempts to stop it will simply make the situation worse. Ask the family what usually calms the child, such as a particular toy or music.
f. Ask about augmentative and alternative communication devices or computer-aided communication tools such as a computer or tablet device with special apps or a speech-generating device. Children with ASD may use these devices to help them communicate.
g. Many children with ASD respond negatively to light touch, so it is often better to apply gentle but firm pressure when necessary to touch the child. Keep in mind that touch from another person in general—even from parents and caregivers—may be a major source of discomfort for children with ASD. Consequently, such tactile stimulation should be minimized as much as possible, and should always be preceded by careful, descriptive explanation of what you need to touch and why. Explain one procedure, do it, and then explain the next procedure.
h. Do not restrain the child unless absolutely necessary to protect the patient from harm. Work closely with the family to identify dangerous behaviors and to devise a plan to calm the patient or to restrain him or her if it does become necessary.

E. Overcoming communication barriers related to Down syndrome

1. Another condition seen in children that is associated with developmental delays is Down syndrome, also known as trisomy 21.
   a. Down syndrome affects approximately 1 in every 700 babies born in the United States.
   b. Life expectancy for children with Down syndrome has increased dramatically over the years; they live more than four times longer today than did their counterparts in 1960.
   c. They remain at a higher risk for a number of serious medical conditions and disabilities.
   d. Every child with Down syndrome is unique, and cognition and communication abilities among these children vary widely.
2. Difficulties understanding the speech of a child with Down syndrome are quite prevalent.
3. When communicating with a child with Down syndrome, be patient and ask for clarification when necessary.
4. Communications tips to help care for children with Down syndrome

a. Ask the parent or caregiver about the child's level of communication and understanding. Do not assume that the child is unable to understand what you are saying or doing.
b. Involve the child in all aspects of care. Encourage questions or conversation. Do not discourage chatter; it serves a similar calming purpose as self-stimulating behavior in children with autism.
c. Be concrete and literal when giving explanations and instructions, and ask only one question or give one instruction or explanation at a time.
d. Ask direct questions about pain or discomfort with each segment of the physical examination. Do not misinterpret lack of outward expression of distress as lack of pain or other discomfort.
e. Provide a comfort item or distraction.

F. Overcoming barriers related to hearing impairments

1. There are many types and causes of hearing loss, and the degree ranges from mild hearing impairments to profound deafness.
2. For the community paramedic, communication with children who have significant hearing loss can be challenging, especially when associated with other physical, developmental, or behavioral conditions.
3. When independent of other factors, deafness and the use of sign language have been associated with:
   a. Lower health knowledge
   b. Decreased use of preventive services
   c. Increased health disparities
4. Note that many people in the deaf community do not view deafness as a disability, but as a culture with its own language and shared values.
5. Communication skills and preferences are unique to the individual and should be determined in the initial meeting with the patient and caregivers.
   a. Important resources in developing an effective communication strategy:
      i. Physician's plan of care
      ii. School's individualized education plan
6. Methods of communication vary widely and differ significantly between communicating with others in the deaf community.
   a. Communication methods may include some combination of:
      i. Oral communication
      ii. Lipreading
      iii. Sign language
      iv. Gesturing
      v. Drawing
      vi. Writing
      vii. Use of text or computer word processors

viii. Graphic imaging

7. American Sign Language (ASL) is considered the primary language of Americans who are deaf or hard of hearing, although there are other communication options used.
   a. ASL comprises a strictly defined set of hand gestures and facial expressions, whose meaning can be changed by an inflection in facial expression or body movement/gesture.
   b. ASL is not a word-for-word translation of spoken language, but a way to convey meaning through visual symbols.
   c. People who are fluent in ASL may not speak, write, or read English.
   d. Americans With Disabilities Act
      i. Professional ASL interpreters or a reasonable alternative may be required by law for most nonemergent patient encounters
      ii. This act also requires the use of an interpreter when the pediatric patient's parent or caregiver is deaf or hard of hearing.
      iii. A family member who is fluent in sign language may not be considered a reasonable alternative to professional interpreters.
8. Communication tips to help care for children who are deaf or hard of hearing
   a. Go to a quiet, well-lit space and sit or stand so that the light is not behind you.
   b. Get the patient's attention before speaking, and make eye contact.
   c. Ask the patient about communication preferences, such as lipreading, writing on paper, using a computer or tablet, or sign language. Keep in mind that even the best lip-readers only understand about 25% of what is said.
   d. Speak clearly at normal pace and volume.
   e. Use open-ended questions to verify understanding.
   f. Rephrase questions that are not understood rather than repeating the questions continuously.
   g. Use gestures, facial expressions, and body language to help convey meaning.
   h. Be patient and avoid statements such as "Never mind" or "It's not important anyway."
   i. When writing back and forth to communicate, use shorter, simpler sentences at first and build upon them based on the patient's understanding and responses.
   j. When using an interpreter, have the interpreter stand beside and slightly behind you so that you can speak directly to the patient. Keep your focus on the patient even when the interpreter is translating the patient's answers to you.

G. Overcoming physical and physiologic barriers to communication

1. Many physical disabilities can interfere with the ability to communicate including:
   a. Muscular dystrophy

   b. Cerebral palsy
   c. Paralysis
   d. Structural deformity secondary to illness or injury
2. Communication difficulties may stem from physiologic or structural problems or from the use of special equipment such as tracheal tubes and ventilators.
3. While some physical disabilities are associated with cognitive or developmental disorders, many are not.
4. Misperception of children's cognitive abilities based on physical appearance poses an all too common, yet completely avoidable, communication barrier.
   a. Example: Many people with cerebral palsy do not have cognitive deficits.
5. Communication tips to help care for children with physical or physiologic barriers
   a. Do not make assumptions about cognition or the ability to communicate. Ask the child and family about abilities and communication preferences.
   b. Avoid talking over the patient, and always include the patient in the conversation and care regardless of physical or cognitive abilities or limitations.
   c. Be patient with communication, and allow time for the child to answer fully. Although family members and caregivers will sometimes do so, avoid the temptation to finish sentences when the child's speech is slow.
   d. When urgency is necessary, let the child know that you are still listening in case he or she needs something.
   e. Be honest about your difficulty understanding speech or what the patient is trying to tell you. Do not try to fake it; this approach is seldom successful and can lead to significant miscommunication and loss of trust.
   f. Offer alternatives. Many children are quite adept at communicating with a computer or other technology, and some do well with pen and paper.
   g. As always, work closely with the family and caregiver.

V. Children Using Technology-Assistive Equipment

1. Children who use technology-assistive equipment constitute a subset of children with special health care needs that may require health care providers' assistance.
2. It is important for community paramedics to become familiar with the various types of medical technologies that they may encounter and have to troubleshoot.
3. The most common types of technology used by children with special health care needs include:
   a. Some form of respiratory support, such as supplemental oxygen or mechanical ventilation
   b. Technologies to support nutrition, such as gastrostomy tubes
4. While community paramedics are not expected to provide daily, ongoing monitoring of such devices, the community paramedics should be familiar with:
   a. The operation of the device

   b. The conditions for which they are indicated
5. Patients who use home respiratory support either in the form of supplemental oxygen or mechanical ventilation may have tracheostomy tubes.
   a. Some complications noted among tracheostomy-dependent children include:
      i. Dislodgement of the tube
      ii. Obstruction
      iii. Infection
      iv. Hemorrhage
   b. These patients often have a higher level of home skilled nursing and caregivers who are trained in tracheostomy suctioning or replacement.
   c. Patients with devices for nutritional support usually have equipment that allows for feeding directly into the gastrointestinal tract.
   d. Similar to patients with tracheostomy tubes, these patients may be at risk for gastrostomy tube dislodgement, obstruction, infection, or hemorrhage.
6. There are numerous reasons for dependence on technologies for children with special health care needs. Some of the reasons are:
   a. Present from birth (eg, heart defects)
   b. Due to conditions acquired during childhood
7. An increasing number of these children who are dependent on technology are being cared for in the home—an approach to care that requires coordination among the family, primary care providers, case managers, and specialists: a health care team.

Post-Lecture

Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (**date to be determined by instructor**).

B. Read Chapter 18, “Geriatrics,” for the next class session.

Chapter 18
Geriatrics

Unit Summary

After students complete this chapter and the related course work, they will be able to describe the normal aging process, identify topics to cover when taking the history of a geriatric patient, explain how to conduct a physical examination, identify the five I's of geriatrics, describe depression, delirium, and dementia, identify the potential signs of elder abuse, and describe common complaints of older patients.

Objectives

1. Describe the normal aging process.(pp 323-325)
2. Identify the topics to cover when taking the history of a geriatric patient, including use and abuse of medications and other substances. (pp 325-328)
3. Explain how to conduct a physical examination of a geriatric patient. (pp 328-335)
4. Identify the "five I's of geriatrics," which contribute to abnormal findings in the assessment of older patients. (pp 328-329)
5. Describe mental health disorders, including delirium, dementia, and depression, in geriatric patients. (pp 332-334)
6. Explain trauma-related findings in geriatric patients. (p 335)
7. Identify the potential signs of elder abuse. (pp 335-336)
8. Describe common complaints among older patients, including shortness of breath; abdominal pain; dizziness and vertigo; fever; generalized pain; and nausea, vomiting, and diarrhea. (pp 336-340)

Readings and Preparation

- Review all instructional materials including ***Community Health Paramedicine***, Chapter 18, and all related presentation support materials.
- Review local protocols relating to conducting a physical examination of a geriatric patient; dealing with geriatric patients with delirium, dementia, or depression; identifying, documenting, and reporting potential signs of elder abuse; and assessing and treating the common medical complaints among older patients.

Support Materials

- Lecture PowerPoint presentation

Enhancements

- Direct students to visit Navigate 2.
- Provide copies of local protocols.

Unit Activities

Writing assignments: Instruct each student to put together a scenario for geriatrics.

Student presentations: Divide students into groups. Instruct each group to act out the geriatrics scenario (developed for the writing assignment) for the rest of the class.

Group activities: Discuss and critique each student presentation as a group. Discuss problems regarding taking the history of a geriatric patient, including use and abuse of medications, conducting the physical examination of a geriatric patient, the "five I's of geriatrics," and trauma-related findings in geriatric patients.

Pre-Lecture

You are the Community Paramedic

"You are the Community Paramedic" is an opening case study that encourages critical thinking skills.

Instructor Directions

1. Direct students to read the "You are the Community Paramedic" scenario found a the beginning of Chapter 18.
2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question.
3. You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. Patient assessment approach for geriatric patients

1. The community paramedic's patient assessment approach for geriatric patients is built on his or her paramedic training for emergency care.
2. The patient assessment of the older patient must also incorporate:
   a. A broader spectrum of symptoms
   b. Subtle presentations of instability
   c. Nonspecific generalized complaints
3. Utilizing a multitude of assessment tools may be useful to ensure a thorough patient assessment that accurately reflects the current condition of the patient.

II. Attitudes Toward and Communication with Older Adults

A. Community paramedic's philosophy

1. The community paramedic's basic philosophy should embrace:
   a. Taking an unbiased approach to each clinical experience
   b. Practicing egalitarianism
   c. Providing thoroughly professional care and professional conduct
2. To realize this philosophy, the community paramedic must perform a self-assessment for preconceived attitudes that might negatively influence his or her approach to older patients.
   a. Failure to take stock of personal attitudes may promote negative stereotyping.
   b. The community paramedic's approach to older patients could unconsciously become apathetic and impartial.
3. To avoid problems related to miscommunication, your verbal or nonverbal cues should be consciously caring and benign while speaking to the older patient.
   a. Maintain eye contact.
   b. Speak slowly.
   c. Articulate each word clearly.
   d. Avoid using medical jargon.
   e. Ask patients to explain their discomfort in their own words.
   f. Use the LEARN mnemonic.

III. The Greater Complexity of Older Adults' Health

A. Many older patients present special challenges owing to the complexity of their health conditions.

1. The Occam's razor approach to assessment, diagnosis, monitoring, and management emphasizes that the simplest diagnosis is the most likely diagnosis.
2. The approach to the geriatric patient should include a comprehensive evaluation of both internal and external risk factors.
3. As part of the assessment, the community paramedic should investigate any iatrogenic causes or side effects from a plan of care that may be contributing to the patient's symptoms.
4. Aging is a subtle process, in which changes in the body typically occur gradually.
    a. Lean muscle mass decreases by 20%
    b. Weight of the kidneys decreases by 80%
    c. Serum albumin decreases to approximately 3.8 g/dL
    d. Hepatic blood flow decreases by 60%
    e. Body weight typically increases more than 38%
5. Deteriorative changes produce:
    a. Reduction in organ function
    b. Decrease in the ability to maintain homeostasis
    c. Increase in disease susceptibility
6. Collectively, these aspects of the aging process render the older adult more susceptible to illness.

B. Cognitive changes in older adults

1. Cognitive changes naturally occur as a person progresses through the various stages of life.
    a. Can occur gradually or rapidly
2. There are three parts of memory:
    a. Working memory: processes information and executes functions on a routine basis
    b. Long-term memory: holds information that has been repeated many times and is being retained
        i. Includes semantic memory (memory for facts and general knowledge)
    c. Prospective memory: memory necessary to perform actions in the future, such as carrying out a task
3. The most common causes of cognitive impairment in older patients is known as the "three D's":
    a. Dementia
    b. Depression
    c. Delirium

4. Always interview the patient first, but if his or her caregiver is available, and if talking to the caregiver about the patient is appropriate, seek additional details from this person.
5. Establishing a patient's cognitive baseline during the first patient encounter is essential for an accurate patient assessment throughout the therapeutic relationship.
    a. Mental status assessment should be performed during each patient assessment.
    b. Many older patients have significant cognitive impairment that is undiagnosed.
    c. Never assume confusion is "normal."

IV. Overview of Geriatric Patient Assessment

A. Requirements for patient assessment on older adult

1. Performing a patient assessment on an older adult is more complicated and requires a greater level of knowledge from the community paramedic than does the assessment of a younger adult patient.
2. A more comprehensive history and physical examination will lead to a more accurate patient assessment and improved monitoring and management.

B. Format of Patient Assessment

1. The patient assessment in community paramedicine proceeds through:
    a. General information
    b. Chief complaint
    c. History of present illness
    d. Past medical history
    e. Family medical history
    f. Social history
    g. Medications and allergies
    h. General assessment
    i. Vital signs
    j. Review of systems
2. An older patient is more likely to have more complex conditions compared to a younger adult.
3. An older patient's evaluation of his or her quality of life and functional status is an integral part of determining his or her independence.
4. The patient's level of frailty influences his or her physiologic ability to maintain homeostasis.
5. The community paramedic should recall that the clinical presentation of an older patient may encompass a wide range of symptoms, such as:
    a. Altered mental status

b. Behavioral changes
c. Incontinence
d. Gait disturbances
e. Weight loss
f. Falls

C. History taking

1. The history should include the patient's:
   a. General living environment
   b. Chief complaint
   c. History of present illness
   d. Social history, including the patient's functional ability to perform:
      i. Activities of daily living (ADLs)
      ii. Instrumental activities of daily living (IADLs)
2. The history should also include review of the patient's current medications (prescribed, over-the-counter, and herbal) to help the medical director or the patient's primary care physician identify any adverse reactions that may be contributing to the presenting symptoms.

D. General information

1. Assessment of the home should include the following considerations:
   a. Is the home clean or dirty?
   b. Is there food in the house?
   c. Which medications are in the house or noted among the patient's belongings?
   d. Is the patient at risk of abuse or neglect?
   e. Is there evidence of use of drugs or alcohol?
2. Observe the patient's appearance and demeanor for signs of cognitive impairment.

E. History of present illness

1. The mnemonic OPQRST-ASPN is a useful tool in community paramedicine for describing the present illness.
2. OPQRST-ASPN incorporates the following elements:
   a. **O**nset
   b. **P**rovocation/palliation
   c. **Q**uality
   d. **R**egion/radiation
   e. **S**everity
   f. **T**ime (temporal aspects)
   g. **A**ssociated **s**ymptoms
   h. **P**ertinent **n**egatives

F. Past medical history

1. A complete past medical history includes determining the patient's:
   a. History of childhood illness
   b. Medical history
   c. Surgical history
   d. Psychiatric history
   e. Family history
2. Pertinent and relevant medical history should include comorbidities that may be contributing to the chief complaint:
   a. Hypertension
   b. Diabetes
   c. Chronic renal disease
   d. Food or drug allergies
   e. Emotional or sexual health issues
3. It is essential to obtain a family history, which may reveal hereditary risks for certain disease processes, such as:
   a. Hyperlipidemia (high cholesterol levels)
   b. Undiagnosed cardiac disease
   c. Hypertension (high blood pressure)

G. Social history

1. Older patients who do not have sufficient financial resources or who experience functional impairments often rely on others to meet their daily needs.
2. Family, friends, or neighbors often become unpaid caregivers.
3. The community paramedic must focus on the full scope of the patient's needs—what are is being provided, when, where, and by whom.
4. If appropriate, informal caregivers who are essential to the care of the geriatric patient may provide additional information about the patient's medical history.

H. Medications and allergies

1. According to the World Health Organization (WHO), inappropriate use of medicines has become a worldwide risk, increasing the percentage of drug-related problems.
   a. The older population accounts for approximately 30% of all prescriptions written in the United States, with the typical older patient taking four or five prescription drugs and two over-the-counter medications.
2. As the number of medications prescribed to an older patient increases, so does the risk of iatrogenic drug-related adverse reactions.
3. For the community paramedic, understanding the principles of pharmacokinetics (ie, absorption, distribution, metabolism, and elimination) in the older patient will assist with identifying medication-induced conditions.
   a. Decreased renal mass and blood flow result in reduced drug efficiency.

b. Plasma concentration of medications remains higher for longer periods in older adults (ie, medications are not eliminated quickly).
c. Risk of side effects (eg, altered mental status, confusion, and delirium) is increased.

4. Medication inventory
   a. A thorough medication inventory is essential as part of the assessment of the older patient.
      i. Over-the-counter medications (eg, nonsteroidal noninflammatory drugs [NSAIDs], aspirin)
      ii. Herbal remedies
      iii. New medications (prescription or nonprescription)
      iv. Change in medication dosage
   b. Maintaining the medication inventory and ensuring compliance are critical to the patient's continued care and can be achieved only through accurate documentation of the patient's current medication(s).
   c. Medication errors can occur from underdosing and overdosing (accidental or purposeful).
   d. Community paramedics can determine medication compliance by evaluating prescription bottles for the:
      i. Date
      ii. Dose
      iii. Quantity prescribed
5. Substance abuse among older adults
   a. The National Council on Alcoholism and Drug Dependence has reported that 30% of all medications prescribed in the United States are intended for people 65 years and older.
      i. Research has indicated that the rate of prescription medication abuse is higher in this population than in younger patients.
      ii. A significant factor is insufficient mitigation of pain in patients with chronic conditions.
   b. If you suspect substance abuse, assess the patient's symptoms, watch for nonverbal cues (eg, pinpoint pupils, constipation, memory loss, and slurred speech) and obtain a medication inventory.
   c. Medical histories should also include information about personal habits regarding alcohol intake, tobacco use, and caffeine consumption.

V. Physical Examination

A. Major techniques

1. As with younger patients, four major techniques are used when performing a physical examination of a geriatric patient:
   a. Inspection
   b. Palpation
   c. Percussion
   d. Auscultation

B. General appearance

1. Look at the patient overall, and get an impression of his or her general appearance. The goal is to formulate a general impression of the patient's condition.
2. For clues to the patient's condition and underlying disorders, observe the patient's:
   a. Behavior
   b. Alertness
   c. Grooming
   d. Personal hygiene
   e. Facial expressions
   f. Demeanor
3. When indicated, the community paramedic may consider using assessment tools relating to the five I's of geriatrics during this stage of the physical examination.
4. Five I's of geriatrics describe the specific challenges of assessing the older adult:
   a. Intellectual impairment
      i. Key question: Based on the patient's first response, does he or she appear awake, alert, and attentive?
      ii. Mini-Cog tool can be used to detect cognitive impairment.
   b. Immobility
      i. Key question: How steady are the patient's gait and balance?
      ii. Get Up and Go test can be used to assess the patient's mobility
   c. Instability
      i. Key questions: Does the older patient appear frail? Is there evidence of muscle wasting or unplanned weight loss of 10% of total body weight? Are there any signs of dry mucosa, dehydration, or poor dentition or denture fit?
   d. Incontinence
      i. Key question: Does the patient have control over his or her urinary function?
      ii. The DIAPPERS mnemonic

a) **D**elirium
b) **I**nfection
c) **A**trophic urethritis (inflammation of the urethra)
d) **P**harmacy-induced
e) **P**sychological
f) **E**xcess urinary output
g) **R**estricted mobility
h) **S**tool impaction

e. Iatrogenic disorders
   i. Key question: Could the older patient be experiencing an adverse reaction from interactions among prescribed medications or over-the-counter medications, or from a previous medical procedure?

6. These challenges can be addressed through specific assessment techniques.

C. Skin assessment

1. The general appearance of aging skin often provides details that can guide and assist the community paramedic in determining:
   a. An underlying disease process
   b. The potential for abuse
      i. Note location and shape of bruises.
2. Skin that is loose with poor elasticity could be a sign of dehydration.
   a. Pale skin may indicate anemia.
   b. Jaundice may indicate hepatitis or cholecystitis.
   c. Generalized pigmentation may suggest hemochromatosis (overingestion of iron).
   d. Dark and thickened skin in the folds of the body (*acanthosis nigricans* or keratosis nigricans) may indicate type 2 diabetes.
3. Also examine the skin for open wounds and note their location.
   a. Arterial insufficiency
   b. Venous insufficiency

D. Head and neck assessment

1. Observe the older patient for signs of head or face injury.
2. If there is a possibility of head injury, look for signs of altered mental status during the neurologic assessment.
3. Use caution when assessing and palpating the neck of an older patient.
   a. Arthritic changes in the neck make cervical vertebrae more prone to fracture.
   b. Never manipulate the spine.

E. Cardiorespiratory assessment

1. Lungs and heart

a. Assess the chest for symmetry, rise, and expansion.
b. Observe for bruising, tenderness, or radiating pain to the neck, shoulders, or back.
c. Assess the lungs via auscultation. The community paramedic should be aware that loss of elasticity of the chest wall means that injury to the underlying lung is possible with less force in older people.
d. Assess the heart, noting the apical impulse, rate, and rhythm, as well as any heart sounds, murmurs, rubs, or gallops.

2. Circulatory function
   a. Circulatory function reflects the effectiveness of cardiac output
      i. Cardiac output = stroke volume × heart rate.
   b. The normal aging adult heart is less responsive to stimulation from the nerves that adjust the heart rate and strength of contraction, which can result in a lower heart rate and weaker pulse than expected.
   c. Heart sounds
      i. Normal heart sounds consist of S_1 and S_2. As a person ages additional heart sounds and murmurs may develop.
      ii. When extra heart sounds appear, the community paramedic must document the finding.
      iii. Note any heart murmurs and document timing, intensity, location, radiation, quality, pitch, and loudness of the murmur.
   g. Heart rate and blood pressure
      i. Heart rate, blood pressure, capillary refill, and mental status are all indicators of circulatory status.
      ii. Heart rate may be affected by medications commonly taken by older people, especially beta-blockers, calcium channel blockers, and antiarrhythmic medications.
      iii. Keep in mind that blood pressure levels considered normal in younger patients may be cause for concern in the older patient.
      iv. Low blood pressure is an indicator of hypoperfusion.
      v. When an older patient develops hypotension, the community paramedic should determine if there are contributing factors, such as inducement from prescription medications, post-gastrointestinal symptoms, vasovagal stimulation from vomiting, or postprandial hypotension (decrease in blood pressure following a meal).
      vi. Assessing volume status, or dehydration, is also different in older patients than in younger patients.
      vii. Circulation abnormalities may include resistant hypertension.
         a) The prevalence of resistant hypertension in the United States is 70 million persons, or 1 in every 3 adults.
         b) There are two categories of resistant hypertension: difficult-to-treat hypertension and truly resistant hypertension.

3. Airway function
    a. Aging-related changes
        i. Airway management in the older adult can be compromised by several common anatomic changes, which results in increased work of breathing.
        ii. An older patient's ability to protect his or her own airway may be compromised as the result of a prior disease (eg, stroke or dementia).
    b. Breathing assessment
        i. When assessing the effectiveness of breathing in older patients, remember that the normal range for respiratory rate in this age group is the same as that in young adults—12 to 20 breaths/min.
        ii. The patient's clinical presentation determines the severity of pulmonary compromise (audible respiratory wheezes, cough, speaking in one-word answers).
    c. For the older patient, initial lung auscultation should be performed at the bases first, where rales or crackles will be heard initially, as fluid fills the lung fields from the bottom up.
    d. When further assessment and evaluation are needed, the community paramedic can perform:
        i. Egophony
        ii. Bronchophony

F. Neurologic assessment

1. Mental status assessment
    a. Observe the patient
        i. Is the patient alert, responsive, making eye contact, and speaking in a clear voice?
        ii. Is the patient's response appropriate to the questions being asked?
        iii. Is the patient in pain?
    b. Determine the patient's orientation to person, place, time, and event
        i. Ask what day of the week it is or if the patient knows where he or she is right now.
        ii. Confer with a family member or caregiver.
    c. Determining whether the patient's mental status impairment is chronic or acute may indicate the severity of the condition.
2. Depression
    a. Development in older adults often coincides with neurologic or cardiac disorders, medication side effects, electrolyte disturbances, nutritional deficiencies, and psychosocial loss.
    b. Impaired biologic synthesis of serotonin, norepinephrine, and dopamine as a result of the natural aging process may contribute to depression symptoms.
    c. Depression is widespread among all adults but is often not recognized or treated.

d. Many older adults face chronic illnesses as well as various social and economic difficulties, and health care professionals may mistakenly conclude that depression is a normal consequence of these problems.
e. Your mental health assessment of the older patient should include both physical conditions and social and economic attributes that may contribute to the diagnosis of depression.
f. Improved mental health screening may improve detection and treatment of mental disorders before drastic consequences, such as suicide, can occur.
    i. Ask the patient about suicidal ideation.
    ii. The clinical presentation of depression may include blunt affect, avoidance of eye contact, poor hygiene, and behavioral symptoms such as uncooperativeness, moody responses, and social withdrawal.
g. Use the Geriatric Depression Scale (GDS) to assess the risk of depression.

3. Dementia
    a. Dementia is a slow process of declining cognitive function.
    b. The community paramedic must be cognizant of contributing causes that may produce dementia-like symptoms.
    c. Prudent history and focused questions will help the patient's physician.
4. Delirium
    a. Delirium, unlike dementia, has a rapid onset and a brief duration and is reversible.
    b. As people age, the incidence of delirium increases, often in association with both comorbidities and medical illnesses.
    c. Signs of delirium involve cognitive impairment; patients can cycle between hyperalertness and drowsiness, and they may experience perceptual disturbances, such as hallucinations or delusions.
    d. Both intrinsic and extrinsic factors may contribute to the development of delirium.

G. Abdominal assessment

1. Assess the liver, spleen, and kidney area for ecchymosis, shape, and pain or tenderness when palpated.
2. Note that the abdominal organs of an older patient will not necessarily be in exactly the same location as in a younger patient.
3. Older patients have a blunted immune response, so they do not develop inflammation or an increase in sensory perception as a younger patient with an abdominal condition might.
4. They often do not have the typical symptoms or physical findings associated with abdominal complaints.

H. Musculoskeletal assessment

1. To address potential injuries to the older patient, the community paramedic must be able to distinguish between normal pathophysiologic changes that occur with age and abnormal changes.
    a. For example, bone and joint deformities may occur with age or may be induced by injuries
2. Muscle or ligament injuries, although less common, will result in reduced movement due to swelling and tendon damage.
    a. Evaluate patient's range of motion (ROM)
        i. Active ROM
        ii. Passive ROM
3. Muscle or ligament injuries will result in reduced movement due to swelling and tendon damage.
4. Document the joints assessed and any complaints of pain or signs of stiffness, spasm, or weakness. Occasionally older patients with kyphosis and arthritis of the spine will have discomfort.
5. Deformity of the extremities may be the result of aging or disease, rather than injury.
    a. Community paramedics should be familiar with the typical deformities that occur to the fingers in the case of severe arthritis (osteoarthritis and rheumatoid arthritis).
6. The rule of symmetry is an important consideration, especially when assessing an older patient.
    a. A physical finding on one side of the body that is present on the other side of the body is more likely to be normal.

VI. Trauma in Older Adults

A. Mechanism of injury

1. During your assessment of older patients, you should consider the possibility of injury.
2. Age-related changes cause an increased risk of injury from many sources, but perhaps most notably falls.
    a. Decline in vision
    b. Decrease in range of motion
    c. Muscle weakness
    d. Falls may also occur from iatrogenic causes (eg, medication side effects).
3. According to the Centers for Disease Control and Prevention (CDC), falls are a leading cause of death in the United States for people 65 years and older.

B. Assessing for trauma

1. When there is a question of injury, inspect the older patient's physical appearance and assess for any abnormality.
2. Determining the mechanism of injury for an older patient involves asking more questions than with patients in any other age group.
    a. Example: If an older patient falls, the community paramedic should consider the fall to be a symptom produced by a system failure within the body.
        i. Falls caused by weakness, dizziness, or palpitations most likely have a very dangerous underlying cause.
3. When explaining the cause of a fall, some older patients will say they tripped, even if they did not, for fear of being labeled "frail."
    a. Evaluate the patient's mental status and the surrounding environment.
    b. If the patient's account does not seem plausible, then ask questions targeted at determining whether the patient is experiencing physical symptoms.
4. It is better to doubt the patient's story and discover a serious medical problem than to accept an unlikely explanation and miss a potential life threat.

VII. Elder Abuse

A. Defining elder abuse

1. The National Institutes of Health and National Human Resources Association define elder abuse as neglectful or intentional acts performed by a caretaker or family member that has caused or may cause harm or risk of harm to the older adult.
2. The community paramedic should be aware of the different types of abuse:
    a. Physical abuse
    b. Sexual abuse
    c. Neglect
    d. Exploitation
    e. Emotional or financial abuse
    f. Abandonment
3. Notably, 55% of elder abuse cases involve neglect.
4. Physical signs of elder abuse include:
    a. Slap marks
    b. Unexplained burn marks
    c. Unusual bruising
    d. Bruising around the breasts or genital areas
5. Signs of neglect include:
    a. An unkempt appearance
    b. Unusual weight loss

c. Untreated decubitus ulcers (bed sores)

VIII. Common Medical Complaints of Geriatric Patients

A. Shortness of breath

1. Shortness of breath is a common complaint in the older population.
2. As natural physiologic changes occur, functional residual capacity increases, thereby increasing:
   a. The older person's work of breathing
   b. Risk for respiratory failure following an injury or disease process
3. Potential causes
   a. Anxiety
   b. Cardiac disease (eg, CHF)
   c. Pulmonary disease (eg, chronic obstructive pulmonary disease [COPD], bronchitis, asthma, emphysema, and pulmonary emboli)
   d. A variety of other medical conditions, such as pain, bleeding, or medication interactions
4. Abdominal pain
   a. While assessing the older patient with abdominal pain, remember that a good medical history is the key to successful care.
   b. The expected signs and symptoms associated with a particular abdominal problem may be altered or absent in older patients.
5. Potential causes
   a. Diffuse abdominal pain may indicate acute pancreatitis, mesenteric ischemia, peritonitis, gastroenteritis, or sickle cell crisis; abdominal distention with nausea and vomiting may be associated with alcohol abuse or a history of gallstones.
   b. Epigastric pain may indicate dyspepsia, peptic ulcer, or gastric ulcer.
   c. Right upper quadrant pain may indicate cholecystitis, biliary colic, congestive hepatomegaly, or a perforated duodenal ulcer.
   d. Right lower quadrant pain may indicate appendicitis, cecal diverticulitis, or Meckel's diverticulitis.
   e. Bilateral right and left lower quadrant pain may indicate abdominal abscess, abdominal hematoma, cystitis, endometriosis, incarcerated hernia, inflammatory bowel disease, pelvic inflammatory disease, renal stone, ruptured abdominal aortic aneurysm, or torsion of the ovarian cyst or testis.
   f. Left upper quadrant pain may indicate gastritis or splenic disorder or rupture and associated shock.
6. Assessment
   a. The approach to assessment of abdominal pain is the same for the older patient as it is for the younger patient:

i. Observe
ii. Auscultate
iii. Palpate

b. When assessing abdominal pain in the older patient, use the mnemonic OLD CART as a guideline:
i. **O**nset of pain
ii. **L**ocation of pain
iii. **D**uration of pain
iv. **C**haracteristics of pain
v. **A**ggravating factors
vi. **R**elieving factors
vii. **T**reatment

B. Dizziness and vertigo

1. Dizziness means different things to different people and may be described as:
   a. Spinning (vertigo)
   b. Lightheadedness
   c. Weakness
   d. Unsteadiness
   e. Wooziness
   f. Loss of balance
2. Potential causes
   a. Patients complaining of dizziness can be separated into two categories:
      i. Those who experience vertigo
      ii. Those who do not
   b. The most common causes of dizziness with vertigo in the older patient include conditions affecting the peripheral vestibular system (inner ear), including:
      i. Benign paroxysmal positional vertigo
      ii. Ménière disease
      iii. Labyrinthitis
   c. Patients with dizziness but no vertigo can be further divided into those with dizziness when active and those with dizziness when resting.
   d. Causes of dizziness at rest:
      i. Irregular heart rate
      ii. Severe hypotension
      iii. Hypoxia
      iv. Certain heart medications
      v. Over-the-counter medications (cold remedies and herbal medications)
   e. Causes of dizziness that occurs with a simple activity:

i. Low blood pressure
ii. Dehydration
iii. Anemia

f. Determine if the patient has been eating and drinking fluids on a regular schedule, and ask if he or she took any medication before the onset of dizziness.
g. Determine if the patient has diabetes and whether there are signs of low blood glucose such as tremors or sweating.
h. Other possible causes of vertigo or dizziness include:
i. Non-neurologic disorders that lead to inadequate oxygen (hypoxemia) or glucose (hypoglycemia) levels
ii. Certain hormonal changes (eg, thyroid disease)
iv. Effects of drugs that act on the central nervous system
v. Panic disorder, hyperventilation syndrome, anxiety, or depression

3. Assessment
a. Normal vital signs, oxygen saturation, and blood glucose should help rule out most potentially life-threatening causes of dizziness, such as hypotension, heart rhythm problems, and hypoglycemia.
b. Orthostatic (postural) vital signs may identify a low circulating volume that causes dizziness when the patient is standing.
c. Check for:
i. Nystagmus
ii. Evidence of a previous stroke, such as facial droop, arm drift, or slurred speech.
d. Auscultate for bruits over the carotid arteries.

C. Fever

1. The approach to identifying the underlying cause of fever in an older patient should encompass both history taking and physical examination.
2. A fever can be defined as an oral temperature that is greater than 100°F (37.8°C) or, in the older patient, a rise of 2°F (1.1°C) from the person's baseline temperature.
3. Potential causes
a. Fevers of an unknown origin may indicate autoimmune rheumatologic disorders or malignancies (particularly, non-Hodgkin lymphoma).
b. When an older patient presents with a fever and the secondary symptom of a severe headache, consider meningitis.
c. When shaking chills and dyspnea are secondary symptoms, consider pneumonia. Older patients have a higher risk of developing pneumonia; despite antibiotics, pneumonia is a common cause of death in this population.

d. Other causes of fever include infections of the urinary tract, infection in the blood, gastroenteritis, and soft-tissue infections, especially those resulting from pressure ulcers.
e. Although much less frequent, temperature elevation may also be caused by noninfectious problems such as heatstroke, thyroid storm, and aspirin overdose.

4. Assessment
   a. The diagnostic approach to a febrile patient should be guided by the severity of the patient's symptoms.
   b. History must include origin, duration, residence, and past travel to determine exposure risks.
   c. The older patient may not have an elevated heart rate with temperature increase; instead, he or she may have an altered mental status. If this is the case, suspect a serious infection.
   d. Ask about the patient's immunization status. Influenza can be devastating in this population; thus, a yearly flu vaccination in the fall is very important.
   e. Ask the patient or caregiver if the patient's daily activities have recently changed to determine if there could be a urinary tract infection.
   f. Ask if the patient is on medication that is known to alter the fever response (eg, acetaminophen [Tylenol], aspirin, or NSAIDs) or alter the ability to fight infection (eg, steroids such as prednisone).
   g. Determine the presence of any other diseases or conditions that may elevate the risk of infection, such as diabetes, kidney stones, or gallstones.
   h. As you perform the physical examination, note any red, warm, tender, or swollen skin areas, which may indicate the presence of infection.
      i. Specifically, look for pressure ulcers that may have developed over high-pressure areas such as the heels, sacrum, or buttocks.
   i. Local or generalized abdominal tenderness upon palpation may also be the result of infection.
   j. Fever in an older patient means serious infection until proven otherwise. Older patients with fever must be assessed for the existence of sepsis.

D. Generalized pain

1. Pain is wherever the patient determines it to be.
2. Older people experience pain about twice as often as younger adults.
3. Pain can be:
   a. Long-standing (chronic)
   b. Of recent onset (acute)
4. Potential causes
   a. The causes of acute pain in older people are the same as in younger people, and generally are the result of acute illness or injury.

b. Chronic pain in older people tends to result from the normal wear and tear of aging or the effects of chronic disease.
c. Some of the more common causes are:
    i. Musculoskeletal and neurologic disorders (eg, arthritis, osteoporosis; shingles, and nerve damage from diabetes)
    ii. Cancer
    iii. Depression
d. Psychiatric problems such as depression can cause pain or worsen a patient's perception of existing pain.

5. Assessment
    a. Owing to their decreasing sensory perception, older persons often do not have the typical symptoms seen in younger patients.
    b. History is key to pain evaluation. Use open-ended questions to start; follow up with direct questions.
    c. An accurate history will reveal the most helpful information concerning the patient's pain.
        i. If the patient cannot provide a history, enlist the help of family, friends, caregivers.
        ii. To be successful in the assessment of an older patient with pain, the community paramedic must demonstrate empathy and interest in the patient's problem.

E. Nausea, vomiting, and diarrhea

1. A community paramedic should automatically assess any older patient experiencing nausea, vomiting, or diarrhea for dehydration.
2. Dehydration in an older patient can cause an altered mental status, rapid weak pulse with hypotension, and an increased risk for stroke or transient ischemic attack.
3. Potential causes include, but are not limited to:
    a. Infectious disease
    b. Food poisoning (bacterial contamination)
    c. Medication-induced nausea, vomiting, and diarrhea
    d. Stress (emotions)
    e. Obstructed, distended, twisted bowel
    f. Motion sickness
    g. Inner ear infection
    h. Poisoning/overdose
    i. Diabetes
    j. Inflammatory bowel disease
    k. Constipation
    l. Lactose intolerance

4. Assessment
    a. Determine if the nausea, vomiting, or diarrhea is acute or chronic.
    b. Determine the onset, frequency, appearance, color, and odor of the vomit or stool.
    c. Determine the presence of dehydration through vital signs and dry mucous membranes.
    d. Recall that nausea, vomiting, and diarrhea can be the result of a problem inside or outside of the gastrointestinal system.
    e. Signs and symptoms of gastrointestinal bleeding:
        i. Red blood in vomit (hematemesis)
        ii. Red blood in stool (hematochezia)
        iii. Tarlike stools (melena)

Post-Lecture

Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (**date to be determined by instructor**).

B. Read Chapter 19, "Hospice and Palliative Care," for the next class session.

Chapter 19
Hospice and Palliative Care

Unit Summary

After students complete this chapter and the related course work, they will be able to discuss the differences and similarities between palliative care, curative care, and hospice care, list the five stages of grief, describe the strategies the community paramedic may use in assisting a patient and his or her family with a terminal illness, explain how the incident command structure can provide a framework in organizing the resources that may be used in hospice care, discuss do not resuscitate (DNR) orders, physician orders for life-sustaining treatment (POLST), and medical orders for life-sustaining treatment (MOLST), and explain the importance of knowing the laws surrounding end-of-life issues in the state of practice.

Objectives

1. Compare the differences and similarities between palliative care, curative care, and hospice care. (pp 345-346)
2. List the five stages of the grieving process as developed by Elisabeth Kübler-Ross. (p 347)
3. Describe the strategies the community paramedic may employ in assisting a patient with a terminal illness. (pp 347-348)
4. Describe the strategies the community paramedic may employ in assisting the family members of a patient with a terminal illness. (p 348)
5. Explain how to interact across multiple cultural and religious customs while caring for a patient in hospice care. (pp 348-349)
6. Explain how the incident command structure can provide a familiar framework in organizing the potential resources that may be used in hospice care. (pp 349-350)
7. Describe how advance directives, do not resuscitate (DNR) orders, and physician orders for life-sustaining treatment (POLST) may be used to preserve patient autonomy. (pp 350-351)
8. Explain the importance in knowing and understanding the laws surrounding end-of-life issues in the state of practice. (p 352)

Readings and Preparation

- Review all instructional materials including ***Community Health Paramedicine,*** Chapter 19, and all related presentation support materials.
- Review local protocols relating to palliative care, curative care, and hospice care, do not resuscitate (DNR) orders, physician orders for life-sustaining treatment (POLST), medical orders for life-sustaining treatment (MOLST), and end-of-life issues in the state of practice.

Support Materials

- Lecture PowerPoint presentation

Enhancements

- Direct students to visit Navigate 2.
- Provide copies of local protocols.

Unit Activities

Writing assignments: Instruct each student to put together a scenario for hospice and palliative care.

Student presentations: Divide students into groups. Instruct each group to act out the scenario for hospice and palliative care (developed for the writing assignment) for the rest of the class.

Group activities: Discuss and critique each student presentation as a group. Discuss problems regarding the differences in palliative care, curative care, and hospice care, the five stages of grief and caring for a terminally ill patient, strategies for caring for the terminally ill patient, and how do not resuscitate (DNR), physician orders for life-sustaining treatment (POLST), and medical orders for life-sustaining treatment (MOLST) may be used to preserve patient autonomy.

Pre-Lecture

You are the Community Paramedic

"You are the Community Paramedic" is an opening case study that encourages critical thinking skills.

Instructor Directions

1. Direct students to read the "You are the Community Paramedic" scenario found a the beginning of Chapter 19.

2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question.
3. You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. Caring for the dying patient

1. Novice and experienced paramedics alike have witnessed death and dying.
2. Many training programs spend limited time training paramedics on the comfort care for a dying patient.
3. Establishing a long-term therapeutic relationship with a patient will be a new skill for most paramedics.
   a. Some of these patients may be in hospice and in the process of dying.
4. Caring for a dying patient may be one of the most challenging roles for a community paramedic.
5. Role is switched from developing a field impression and treating it while transporting to the emergency department to enabling the patient to die in familiar surroundings and taking measures to ensure comfort.

II. Palliative Care

A. What it is

1. Palliative care may be provided by a team of specialists in comfort care:
   a. Physicians
   b. Nurses
   c. Caregivers
2. The goal of palliative care is to reduce the severity of symptoms while preserving the patient's ability to function and be independent.
3. Patients undergoing palliative care may receive:
   a. Analgesic medications
   b. Oxygen
   c. Intravenous fluids
   d. Treatment of fevers
   e. Antibiotic medications

4. When symptoms occur, the patient is treated according to the causative source, while preventing further decline.
5. Palliative care can be received by patients at any time, at any stage of illness, whether the patient's condition is terminal or not.
6. Palliative care emphasizes pain control and comfort management during other treatment, such as the regimen of care for a patient awaiting an organ transplant.
    a. Palliative care takes place concurrently with the ongoing care.
    b. It is also a treatment plan of its own during end-of-life care.

III. Care of Patients with Terminal Illness

A. A new way to care

1. Community paramedics will encounter patients with a wide variety of terminal illnesses as well as patients who decline aggressive medical interventions.
2. Most sources define terminal illness as a disease process that is expected to cause death within 6 months, verified by a physician.
3. When you are treating these patients, you must be prepared to alter or forego the aggressive, lifesaving interventions that have historically defined the paramedic profession.
4. If you are called to a scene in which death is imminent, the actions you take may have a lasting impact on the family. This is a time when compassion, understanding, and sensitivity are most needed.
5. Patients with a terminal illness who receive continued aggressive medical care are receiving curative care.
6. Patients with a verified terminal illness may choose to enter hospice treatment.
7. Hospice is a program and philosophy that attempts to help the terminally ill patient maximize the quality of remaining life.
    a. Decision to enter hospice is made by the patient in consultation with a primary care physician and family members.
    b. Enrollment made upon referral from the primary care physician when the patient is expected to live 6 months or less.
8. Hospice programs:
    a. Provide social and emotional support
    b. Treat discomfort with pharmacologic and nonpharmacologic approaches
    c. Help patients and families cope with the prospect of impending death
9. Patients may receive hospice treatment at:
    a. Home
    b. Hospitals
    c. Long-term care facilities

B. Hospice care

1. Comfort measures, such as pain medications, are often provided in a home setting.
2. There are also dedicated facilities for hospice care.
3. The overall goal of comfort measures for patients is to relieve symptoms of psychological or physical distress.
4. Many hospice programs:
   a. Provide physical care
   b. Assist with hygiene
   c. Counsel the patient and the caregivers
   d. Supply medical equipment and/or supplies
5. If care is provided in the home, family members may serve as the primary caregivers.
6. The hospice team is available 24 hours a day, and members have specialized training in palliative care.
7. The team usually consists of:
   a. The patient's personal physician or hospice physician
   b. Visiting nurses
   c. A home health aide
   d. Social workers
   e. Chaplains
   f. Trained volunteers
8. A common misconception:
   a. Once a patient is on hospice, the patient must remain in hospice.
   b. A patient can stop hospice services at any time and for any reason (called hospice revocation).
9. Hospice services continue as long as the patient still meets hospice criteria and is still declining, even after the initial 6-month period.

IV. Coping With Death and Dying

A. Culture's influence on death

1. As a paramedic, you have been there when people are born, and you have been there when people die.
   a. Every one of these encounters is an honor—a most private moment in someone's life, to which you are invited.
   b. In some cultures, these moments are a holy time, and you should consider it a privilege that the patient is willing to share the moment with you.
   c. In other cultures, such as those in the western hemisphere, death is regarded as a traumatic experience, something to be feared and postponed as long as

possible, and you should consider it a sign of respect for your professionalism that the person has requested your assistance.

B. Stages of the grieving process

1. In her classic study, detailed in the book *On Death and Dying*, Elisabeth Kübler-Ross, MD, defined the five stages of grief people go through.
   a. Each of these stages helps the dying or their family members adapt to their own reality.
   b. It helps to be aware of these stages and to consider the behavior of dying patients or their families in the context of the grieving process.
   c. Be aware that all people do not follow the stages in order or experience each stage.
   d. The community paramedic may also experience some of these stages when caring for a dying patient.
2. Five stages of grief
   a. **Stage 1: Denial.** Denial is a mechanism by which people attempt to ignore a problem or pretend it does not exist.
   b. **Stage 2: Anger.** When people can no longer deny the reality of a situation, anger over the loss replaces denial.
   c. **Stage 3: Bargaining.** When anger does not change the painful reality of a situation, people may resort to bargaining—that is, trying to make some sort of deal in hopes of postponing the inevitable (eg, "If I can just live long enough to see my daughter's wedding, then I'll die in peace").
   d. **Stage 4: Depression.** When bargaining fails to change the reality of a loss and people must come to terms with dying, there is suddenly an enormous sense of loss.
   e. **Stage 5: Acceptance.** In the final stage of grief, people who are dying prepare to disengage from the world around them.

C. Interacting with the dying patient

1. Patients' reactions to a terminal illness or impending death will differ from person to person.
   a. Some patients may want to discuss their disease, while others will hide it or deny the illness.
2. Remember not to reassure a patient by saying "everything will be alright."
3. One of the most important aspects of care is your ability to listen, allowing the dying patient the opportunity to voice their fears or concerns about death.
   a. Choosing the correct words to address fears about dying is vital.
   b. You can simply say, "If there is anything worrying you, I would be glad to listen."
4. Listening is an essential part of communicating with your patient and the patient's caregivers.
   a. Give the patient ample time to share.

b. Be prepared that your patient may feel angry, sad, or anxious.
c. Do your best not to be judgmental or be offended by anything the patient says.
d. Remember the work of Kübler-Ross and how people grieve.
e. Try to ask open-ended questions to allow the patient to answer fully.
f. Try to reframe the discussion of hope.
    i. Reframe hope as hope for better comfort or for better rest. Find a way to give the patient hope for the present.

5. A quiet and unhurried environment reinforces respect for the patient. If appropriate, ask the patient if it would be alright to touch his or her hand.
6. There is a risk of depression and despair when people lose control over their health. As much as possible:
    a. Ask patients for their personal preferences.
    b. Explain to patients their options.
    c. Inform patients what you are doing to allow them an opportunity to participate in their treatment.
    d. Ask them if there is anyone they would like you to contact or if they have any special instructions they want conveyed to someone.
        i. If they do ask you to convey a message, write it down word for word.

D. Interacting with a grieving family

1. Here are a few guidelines.
    a. Family members may ask if the patient is in pain during the dying process or if the dying process was painful.
        i. For example, if the patient is breathing only six times a minute and exhibits Cheyne-Stokes respirations, the patient's family may ask if their loved one is suffering or what the community paramedic can do to help.
        ii. Answering questions honestly can help decrease anxieties and comfort family members.
    b. This is a stressful time in a family, and tensions may escalate among family members.
        i. Tensions may be driven by the fear that the patient is in pain.
        ii. One way to help care for your patient and deescalate the situation is by explaining in terms they understand what is being done to make the patient as comfortable as possible.
    c. Help facilitate family members to be near the patient, such as sitting by the patient's bedside.
    d. People who are prevented from seeing the body of a loved one after death may later have enormous difficulty working through their grief because they may not be able to get beyond their denial.
    e. Do not use euphemisms for death, such as "expired" or "passed away." The family needs to hear the word "dead."

f. Give the family as much time as they need with their loved one. Make the setting as comfortable as possible.
g. Try to arrange for further support. A neighbor or friend may be available, or you may offer to call the family's clergy.
h. Accept the family's right to experience a variety of feelings, including guilt, shock, denial, or anger.

E. Interacting with a grieving child

1. Be particularly sensitive to the emotional needs of children and how they differ depending on their age group.
   a. Children up to 3 years of age will be aware that something has happened and people are sad.
   b. Children 3 to 6 years of age believe that death is temporary and may continually ask when the person will return.
      i. The family should emphasize to children that they were not responsible for the death and that it is okay for them to cry when they are sad.
   c. Children 6 to 9 years of age may mask their feelings in an effort to not look babyish.
      i. Family members should discuss the normal feelings of grieving with the child. Also, they should not hesitate to cry in front of the child.
   d. Children 9 to 12 years of age may want to know details surrounding the incident.
      i. Family members should encourage the sharing of feelings and memories to facilitate the grieving process.

V. Cultural Effects in Hospice and Palliative Care

A. Honor your patient's customs

1. Each culture may have a different set of beliefs on how to care for family members who are dying, as well as after death occurs.
   a. It is vital to remember that cultural practices and rituals that are important to your patient are not about you.
   b. This is one reason why it is essential to know your own beliefs before you find yourself in a situation that you cannot abide.
2. Communication is key to determining the wishes of the patient.
   a. As a community paramedic, you must know and use the most appropriate language with the patient and caregivers.
   b. Because the goal of end-of-life care is to provide comfort and limited patient care, speaking in the native language of the patient will be of great comfort.
   c. If the patient speaks in a language that you do not comprehend, request a translator so that overall patient care isn't delayed or misunderstood.
   d. Address the patient how they wish to be greeted and spoken to.

3. Find out if the patient wants to participate in his or her own care (if allowed) or if the patient would like you or a caregiver to perform the care.
4. Cultural issues may also surround food and consumption rituals. Ensure that the patient can safely consume these items.
    a. Make sure that you understand if there are rituals involving the food to ensure patient safety as well as to honor customs.

VI. Collaboration With Community Resources

A. Incident command system

1. End-of-life care is a complex task that will involve multiple agencies.
2. It is essential for you to remember and correct the tendency to feel like you are the only caregiver on scene.
3. It may be helpful to frame end-of-life care in an incident command system (ICS) structure.
4. There are five basic functions within ICS. Let's compare those functions with those potentially used in caring for a terminally ill patient as part of a team.

B. Incident commander = the patient or legal surrogate

1. A single person with decision making authority is essential.
    a. Patient
    b. Designated legal surrogate (called a health care proxy)
    c. Court-appointed guardian

C. Planning = the primary care physician

1. The patient's primary care physician will determine how best to medically care for the patient within the direction received from the patient or legal surrogate (incident commander).
    a. To meet the patient's requirements, the physician will direct:
        i. Palliative care
        ii. The use of associated devices as needed

D. Finance = the insurance company

1. The patient's insurance carrier is responsible for determining payment for goods and services.
    a. The amount and type of payment are directed through a written contract between the patient and the insurance company.
    b. Arranging payment may be completed through reimbursement or through a request to purchase form or process.

E. Logistics = vendors of durable medical equipment or other supplies

1. Logistics ensures that all requested equipment and supplies are obtained and delivered to keep the operation running.

a. Logistics depends on the planning and finance functions to obtain the needed items.

F. Operations = patient care professionals

1. In the ICS, the actual task of a given command is carried out by operations.
2. This is where the community paramedic will operate with other patient care professionals.
   a. In end-of-life care, in addition to medical care, there may be a(n):
      i. Spiritual advisor
      ii. Mental health professional
      iii. Social worker
      iv. Caregiver respite group
      v. Dietitian
      vi. Occupational therapist
      vii. Physical therapist
3. All of the tasks performed by these professionals will be directed by the requests of the incident commander.

VII. Patient Autonomy

A. The patient's right to make decisions

1. It is a well-established fact that patients have the right to direct their own care, including their end-of-life medical care. This right is known as patient autonomy.
2. Except where the patient is a minor or lacks decision-making capacity, you must respect and honor the patient's right to make medical decisions.
   a. Patients may revoke a prior advance directive.
3. A number of high-profile legal cases have brought the issue of patient autonomy to the center of the medical ethics debate in the past 20 years.
   a. The Terri Schiavo case
4. Patients' decisions may not be accepted by other members of the public or other members of the patient's family.
   a. It is important to remember that the courts have clearly recognized the right of patients to make decisions about their own medical care, even if that decision will bring about the patient's death.
5. Community paramedics must be cognizant of what is permissible and accepted in the state in which they practice.

B. Advance directives

1. An advance directive is usually a written document (but can also be an oral statement) that expresses the wants/needs/desires of a patient in reference to his or her future medical care.

2. Often referred to as a living will but may also be referred to as a health care directive
3. State what medical care the patient wants or does not want when the patient is unable to express his or her wishes
    a. Such care may include providing nutrition and medication for pain.
4. Living will and health care power of attorney
    a. Both are types of advance directives in which a patient can express wishes regarding end-of-life medical care.
    b. Sometimes called health care "durable" powers of attorney because they remain in effect once a patient loses decision-making capacity
    c. There are various types of powers of attorney and not all of them authorize the designated agent to make decisions regarding health care.
    d. Older patients commonly execute powers of attorney that enable others to conduct financial affairs on their behalf that have no effect on health care.
    e. A power of attorney may have been executed outside the state in which the patient now resides, in which case its effect within your state may be questionable.
5. You should:
    a. Ask to see the power of attorney
    b. Carefully review it to determine whether it authorizes the agent to make health care decisions.
    c. When in doubt, contact a supervisor
6. Living wills generally require some kind of precondition to activate, such as a terminal illness or an irreversible coma.
    a. The living will should spell out exactly what kind of treatment a patient wishes to be given should he or she become incapacitated.
    b. It often contains a health care power of attorney, which designates another person (eg, spouse, partner, adult sibling, parent) to make health decisions for the patient at any time the patient is unable to make those decisions.
    c. In those cases where the living will does not contain a health care power of attorney, its use will be limited.
    d. The person who carries the health care power of attorney is often called the surrogate decision maker.
7. The surrogate decision maker:
    a. Is legally obligated to make decisions as the patient would want and has presumably discussed these decisions with the patient
    b. Has no authority until the patient becomes incapable of making decisions
8. If a surrogate decision maker is attempting to make decisions that conflict with a competent patient's decisions, the patient's decisions are always the ones to be followed.
9. Guardianship: a directive that is functionally similar to a power of attorney

a. Guardianship is a court action that declares a person incompetent to make his or her own decisions and appoints someone to act on the person's behalf.
b. The appointed guardian is responsible for all:
    i. Financial concerns
    ii. Living arrangements
    iii. Health care decisions
c. A key distinction between guardianship and a power of attorney is that while a power of attorney is assigned upon the wishes of the patient, a guardianship is ordered by a court of law without consent from the patient.

10. DNR orders
    a. A do not resuscitate (DNR) order (also referred to as do not attempt resuscitation [DNAR]) is an advance directive that describes which life-sustaining procedures, if any, should be performed if a patient's medical condition suddenly deteriorates into cardiac arrest.
    b. DNR orders must meet the following requirements to be valid:
        i. They must clearly state the patient's wish that cardiovascular pulmonary resuscitation (CPR) not be initiated in the case of cardiac arrest.
        ii. They must be signed by the patient or legal guardian.
        iii. They must be signed by one or more physicians or other licensed health care providers.
        iv. In some states, DNR orders contain an expiration date. DNR orders with expiration dates must be dated in the preceding 12 months to be valid.
    c. Remember, DNR does not mean "do not treat." Even in the presence of a DNR order, you are still obligated to provide all appropriate treatment measures to a patient who is not in cardiac arrest.
    d. You may also encounter physician orders for life-sustaining treatment (POLST) and medical orders for life-sustaining treatment (MOLST) forms when caring for patients with terminal illnesses.
        i. These orders explicitly describe acceptable interventions for the patient in the form of medical orders.
        ii. These forms must be signed by an authorized medical provider in order to be valid.
        iii. The medical provider may be a physician, physician assistant, or nurse practitioner, depending on the state.
    e. Specific guidelines vary from state to state, but the following four statements may be considered general guidelines:
        i. Patients have the right to refuse treatment, including resuscitative efforts, provided that they are able to communicate their wishes.
        ii. A written order from a physician is required for DNR orders to be valid.
        iii. You should periodically review state and local protocols and legislation regarding advance directives.

iv. When you are in doubt, there is confusion, or the written orders are not present, you have an obligation to treat the patient as though the advance directive does not exist.

C. Role of the community paramedic

1. The community paramedic must be aware of and fully understand each of these documents.
2. Because each patient is an individual, each document will be tailored to that individual.
3. The key to abiding by all of these legal documents and concepts is to be fully aware of each patient's situation and each patient's care file.
   a. This is accomplished through full disclosure as well as frank, open communication.

VIII. Physician-Assisted End-of-life Decisions

A. Suicide and euthanasia

1. The debate over assisted suicide and euthanasia is both legally and ethically complex and emotionally charged.
2. Physician-assisted suicide: a premeditated death in which the patient knowingly requests and consents to a self-administered lethal dose of medicine, assisted by a physician
3. Euthanasia: a premeditated death in which the patient knowingly requests and consents to a lethal dose of medicine, but the dose is administered by a physician
   a. Example: Oregon Death With Dignity Act
4. As state legislatures develop versions of death with dignity acts, it is essential for you, as the community paramedic, to:
   a. Know and understand the laws in your state
   b. Understand the concepts of physician-assisted suicide and euthanasia
5. The community paramedic programs in states with death with dignity legislation should have very specific policies and protocols for patients who are in these programs.

Post-Lecture

Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (**date to be determined by instructor**).

B. Read Chapter 20, "Nutrition," for the next class session.

Chapter 20
Nutrition

Unit Summary

After students complete this chapter and the related course work, they will be able to explain the need for nutrition in health, describe the nutritional components of food, list the five food groups, explain the components of a well-balanced diet, and how a community paramedic can help a patient to implement a food plan. Additionally, the students will be able to discuss the nutritional needs of older adults and patients with chronic diseases, such as diabetes, chronic obstructive pulmonary disease, heart failure, and mental illness, describe the components of a special diet, and list strategies to help a patient maintain a special diet.

Objectives

1. Explain the need for nutrition in health. (p 355)
2. List the five food groups. (p 356)
3. Describe the nutritional components of food. (pp 356-364)
4. Describe the components of a well-balanced diet for a healthy adult. (pp 364-365)
5. Describe how a nutritional assessment is performed. (pp 366-368)
6. Explain how a community paramedic can help the patient to implement a food plan written by a nutritionist. (pp 368-370)
7. Explain how to prepare and store food safely. (pp 372-374)
8. Describe the nutritional needs of older adults. (pp 372-374)
9. Describe the nutritional requirements of patients with chronic diseases, such as diabetes, chronic obstructive pulmonary disease, heart failure, and mental illness. (pp 374-378)
10. Describe the components of a special diet. (p 378)
11. List strategies to help a patient maintain a special diet. (p 378)

Readings and Preparation

- Review all instructional materials including ***Community Health Paramedicine***, Chapter 20, and all related presentation support materials.
- Review local protocols relating to performing a nutritional assessment, implementing a food plan, how to prepare and store food safely, and how a community paramedic can help a patient maintain a special diet.

Support Materials

- Lecture PowerPoint presentation

Enhancements

- Direct students to visit Navigate 2.
- Provide copies of local protocols.

Unit Activities

Writing assignments: Instruct each student to put together a scenario for general nutrition.

Student presentations: Divide students into groups. Instruct each group to act out the general nutrition scenario (developed for the writing assignment) for the rest of the class.

Group activities: Discuss and critique each student presentation as a group. Discuss problems regarding the need for nutrition in health, the components of a well-balanced diet, how a community paramedic can help a patient implement a food plan written by a nutritionist, how to prepare and store food safely, and strategies to help a patient maintain a special diet.

Pre-Lecture

You are the Community Paramedic

"You are the Community Paramedic" is an opening case study that encourages critical thinking skills.

Instructor Directions

1. Direct students to read the "You are the Community Paramedic" scenario found a the beginning of Chapter 20.
2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question.
3. You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. People choose the foods they eat for various reasons.

1. Rarely do people choose foods solely in an effort to provide their bodies with the most efficient, healthful fuel sources available.
2. Preparing and sharing food is deeply important in many cultures.
   a. Way of showing love for one's family
   b. Serves as important part of social interaction
3. Unfortunately, in today's often hectic world, many of us have developed unhealthy eating habits.
4. Eating well, maintaining a healthy body weight, and being physically active are instrumental in improving quality of life.
   a. Older adults may not eat well due to numerous reasons.
   b. People with chronic diseases may have specific dietary needs that may or may not be met.

II. Understanding the Need for Nutrition in Health

A. The community paramedic's role

1. The challenge in educating people to use nutrition to improve their health is to provide straightforward, useful information without being insulting or intimidating.
2. The community paramedic's efforts to understand nutrition should be more than just an exercise in memorizing information such as a list of drug dosages.
3. As a community paramedic, you have the opportunity to:
   a. Raise the bar of paramedicine
   b. Be not only knowledgeable and engaged but also a role model for your patients and peers
4. The community paramedic needs to understand the basic concepts of food and nutrition to assist patients in following a food plan created by a nutritionist under the direction of the patient's physician.
   a. Examples of tasks you may be asked to perform:
      i. Working with patients with diabetes to reduce carbohydrate intake
      ii. Monitoring the intake of foods that affect the actions of medications such as warfarin
      iii. Determining ways to assist people who depend on nutrient-poor foods such as ramen noodles to access more nutrient-rich foods, such as fresh foods and vegetables

III. Nutritional Guidelines

A. Evolution of nutritional guidelines

1. Guidance from the US government has evolved over the years to reflect a better understanding of basic nutrition and changes in lifestyle, with the goal being to ensure good health across the life span.
2. The current version of the USDA guidelines, the "Dietary Guidelines for Americans, 2015–2020," focuses on the need for many Americans to select more nutrient-dense foods and beverages.
3. The guidelines emphasize the following:
    a. Following a healthy eating pattern, which includes eating at a calorie level to achieve and maintain a healthy body weight, support nutrient adequacy, and reduce the risk of chronic disease
    b. Focusing on variety, nutrient density, and the amount of food needed to meet nutrient needs within all food groups and within calorie limits
    c. Limiting added sugars, saturated fats, and unnecessary sodium intake
    d. Shifting to healthier food and beverage choices, including those that are nutrient-dense and span the food groups
    e. Supporting healthy eating patterns in all phases of life

IV. Nutritional Balance

A. Nutritional balance

1. Requires ensuring a balance of energy sources such as carbohydrates, protein, and fat as well as a sufficient quantity of vitamins and minerals, including fiber and phytochemicals
    a. There should be a balance in the number of calories consumed and those expended through activity.

B. Food groups

1. The USDA currently defines five food groups:
    a. Fruits
    b. Vegetables
    c. Grains
    d. Dairy
    e. Protein
    f. Although not a food group, oils are recommended for their nutritional value and are found in food sources such as nuts, fish, olives, avocados, cooking oil, and salad dressings.
        i. Ideally, they should not include trans-fatty acids or cholesterol.

C. The nutritional components of food

1. Nutrients are the chemicals in food that are essential for life.
2. The diet for normal human growth, development, and maintenance requires 45 essential nutrients.
3. Deficiency in a nutrient for a length of time can result in a negative health outcome (eg, lack of iron can result in anemia).
4. Other substances in food may not fit the definition of nutrients but are beneficial to the body.
    a. Fiber can enhance digestion.
    b. Phytochemicals, which function as antioxidants, may reduce the risk of heart disease and cancer by combining with or neutralizing free radicals.
5. Six classes of nutrients regulate body processes and contribute to body structures.
    a. Macronutrients: carbohydrates, proteins, and fats needed by the body in large quantities
    b. Micronutrients: vitamins and minerals only needed in small quantities
    c. Water

D. Macronutrients

1. Carbohydrates
    a. Made of carbon, hydrogen, and oxygen
    b. Commonly described as starches or sugars, they can be found in fruits, grains, vegetables, and legumes (dry beans and peas).
    c. Two types of carbohydrates
        i. Simple carbohydrates (sugars such as glucose, fructose, galactose)
        ii. Complex carbohydrates (starches, glycogen, and fiber)
2. Lipids (fats)
    a. Lipids are organic compounds that contain carbon, oxygen, and hydrogen.
    b. Naturally occurring lipids or fats are found in meat and dairy products and some plants, including avocados, olives, and coconuts.
    c. Types of lipids
        i. Triglycerides
        ii. Phospholipids
        iii. Sterols
    d. Fatty acids
        i. Key building blocks that may be attached to a triglyceride or present as free compounds; determine the characteristics of a fat and provide flavors to certain foods like butter
        ii. Nonessential fatty acids are made by the body; essential fatty acids are provided from food.
        iii. Omega-3, omega-6, and omega-9 fatty acids can be burned as energy and used to synthesize new compounds.

e. Triglycerides
    i. Consist of three fatty acids attached to a molecule of glycerol
    ii. Rich and efficient source of calories
f. Excess dietary fat (ie, fat that is not immediately used to provide energy needed by the body) intended to hold us over during times of caloric deficit is stored in fat or adipose tissue.
    i. Visceral fat or subcutaneous fat
g. Lipoproteins
    i. Very low-density lipoprotein (VLDL) is a triglyceride-rich compound formed in the liver and intestines. VLDL gradually releases triglycerides to the body cells.
    ii. Diets high in saturated and trans fats stimulate the release of VLDL and triglycerides from the liver.
    iii. Intermediate-density lipoprotein (IDL) is approximately 40% triglycerides; these compounds acquire cholesterol from high-density lipoprotein (HDL) as the HDL travels through the bloodstream, then return to the liver, where the liver cells convert the IDL to low-density lipoprotein (LDL).
h. Trans-fatty acids raise LDL levels and reduce HDL levels, a combination that may increase the risk for atherosclerosis and heart disease.
i. Conversely, HDL protects against atherosclerosis and heart disease by picking up cholesterol released by dying cells and arterial plaques, thereby preventing their accumulation.
j. Lipids are an important consideration when discussing dietary needs with patients.
k. Current recommendations from the American Heart Association (AHA) stress consumption of two servings of oily fish, such as tuna or salmon, each week.

3. Protein
    a. Proteins are critical for good health. They:
        i. Transport oxygen, vitamins, and minerals to target cells
        ii. Act as enzymes to catalyze chemical reactions
        iii. Act as hormones that serve as chemical messengers for regulatory functions
        iv. Maintain fluid and acid–base balance
        v. Serve as components of antibodies that support immune function
    b. Proteins are organic compounds composed of smaller building blocks called amino acids.
        i. There are 20 different amino acids.
        ii. Nine are considered essential amino acids and must be provided through the diet.

c. Proteins build and maintain body structures, regulate body processes, provide energy, replace skin cells and keep hair, skin, and nails healthy through the production of collagen and keratin.
d. If there is not enough protein, the body will break down muscle to access stored protein, which can cause wasting of organs and other tissues.
e. Excessively high protein levels can contribute to kidney problems, osteoporosis, heart disease, obesity, gout, and some cancers.

E. Micronutrients

1. Vitamins
   a. Organic compounds that contain carbon and hydrogen and, in some cases, oxygen, nitrogen, phosphorus, sulfur, and other elements
   b. The role of vitamins is to regulate body processes such as blood clotting and calcium balance and generally act to keep organs and tissues functioning.
   c. Vitamins do not yield energy directly but have roles in the extraction of energy from fats, proteins, and carbohydrates.
   d. Types of vitamins
      i. Fat-soluble
         a) Vitamins A, D, E, and K
         b) Accumulate in the tissues and can be stored in the body indefinitely
      ii. Water-soluble
         a) Vitamin C, eight B vitamins, folate, pantothenic acid, and biotin
         b) Filtered by the kidneys and excreted in urine
         c) Unlike fat-soluble vitamins, water-soluble vitamins do not need lipoprotein carriers to enter the cells.
2. Minerals
   a. Simple, inorganic substances, at least 16 of which are essential to health
   b. Macrominerals (needed in relatively large quantities as compared with other minerals)
      i. Sodium (Na)
      ii. Potassium (K)
      iii. Calcium (Ca)
      iv. Chloride (Cl^-)
      v. Phosphorus (P)
      vi. Magnesium (Mg)
   c. Microminerals (small quantities are needed to maintain a healthy body)
      i. Iron
      ii. Zinc
      iii. Copper
      iv. Manganese
      v. Molybdenum

vi. Selenium
vii. Iodine
viii. Fluoride

F. Water

1. Water is the most essential nutrient. The human body is nearly 60% water.
2. Water in the body includes dissolved minerals called electrolytes; each cell must have the right mix of water and electrolytes to survive.
3. Water's roles include:
   a. Temperature control
   b. Lubrication of joints
   c. Transport of nutrients and wastes
   d. Facilitation of metabolism
   e. Maintenance of acid–base balance
4. Dehydration occurs when the body does not have enough water.
   a. Chronic dehydration can lead to constipation, hypertension, heart disease, glaucoma, and diabetic complications.
5. Water intoxication occurs when a person overhydrates beyond the kidneys' ability to eliminate the excess water.
   a. Particularly a problem when a person rehydrates with large quantities of water and no electrolytes

V. Components of a Well-Balanced Diet for a Healthy Adult

A. The template for good nutrition relies on two basic concepts:

1. Maintain calorie balance over time to achieve and sustain a healthy weight
2. Focus on consuming nutrient-dense foods and beverages
3. The goal is to effect a gradual change by decreasing caloric intake and increasing caloric expenditure.
4. To make better choices, we need to pay more attention to the packaged foods we buy or invest in preparing our own meals with nutrient-rich content.
5. Helping your patients achieve good nutritional health includes three guiding principles:
   a. First, ensure that all patients have access to nutritious foods and opportunities for physical activity.
   b. Second, facilitate individual behavior through helping the patient to implement the nutritionist's food plan.
   c. Third, set the stage for lifelong healthy eating, physical activity, and weight management behaviors.

VI. Digestion and Absorption Issues

A. Influences and issues

1. Once chewed and swallowed, food is broken down in the gastrointestinal system, nutrients are extracted, and the rest is eliminated as waste.
2. At any step in this process, patients can have problems—with eating, swallowing, digestion, nutrient extraction, or elimination—that interfere with proper nutrition.
3. Influences on digestion and absorption also include:
    a. Psychological influences
    b. Chemical influences
    c. Bacterial influences
4. Some digestion and absorption issues include:
    a. Constipation (often caused by diets low in fiber and water and high in fat)
    b. Diarrhea (can be caused by stress, intestinal irritation, or lactose intolerance)
    b. Lactose intolerance
    c. Gas
    d. Dyspepsia (indigestion caused by impaired digestion)
    e. Heartburn
    f. Gastroesophageal reflux disease (GERD) (gastric contents move backward into the esophagus, causing tissue damage and pain)
    g. Peptic ulcer (a sore that forms in the duodenum or lining of the stomach)
    h. Diverticulosis
    i. Irritable bowel syndrome (IBS)
    j. Colorectal cancer

VII. Food-Drug Interactions

A. Food, drugs, and supplements

1. Drugs can affect the way the body uses nutrients and can alter the activity of other drugs.
2. Certain foods and nutrients, in turn, can enhance or interfere with the effects of drugs.
3. Some herbal, vitamin, or mineral supplements can interact with prescription and over-the-counter drugs.
4. As a community paramedic, you need to be aware of the more common drug interactions that may affect your patients:
    a. Acetaminophen (Tylenol), when used in combination with alcohol, can cause liver toxicity.
    b. Tetracyclines should not be taken with milk, as milk decreases absorption of these drugs.

c. Other antibiotics such as amoxicillin, penicillin, and erythromycin should not be taken with food, as drug absorption will be decreased in such a case.
d. Warfarin (Coumadin) should not be taken with food rich in vitamin K, as this combination will decrease the drug's effectiveness.
e. The combination of alcohol and antihistamines increases the risk for drowsiness.
f. Grapefruit juice can increase the absorption of certain antihypertensive agents.
g. Naproxen (Aleve) should be taken with food or milk to decrease the potential for gastrointestinal irritation.
h. If ibuprofen (Motrin) is used with alcohol, there is an increased risk for liver damage or bleeding in the stomach.

5. All too often, patients fail to advise their doctor about the supplements they are taking or consumption of alcohol, so you may need to make a point of asking specific questions about these products during history taking.

VIII. How a Nutritional Assessment Is Performed

A. A nutritional assessment is performed by a nutritionist under the direction of the patient's physician.

1. Performing a nutritional assessment requires evaluating the current nutritional health of the patient, including identifying risks or deficiencies in his or her diet.
2. A nutritional assessment will begin with determining if the patient is undernourished or overnourished—may or may not be related to weight.
   a. Food history
   b. Questionnaire
3. Once the nutritionist has a good template of the patient's diet, it is compared against the dietary standard to determine overages or deficits
   a. Especially where sufficient key nutrients are not being consumed
4. The assessment of a patient's nutritional needs should take into consideration:
   a. Balance
   b. Adequacy
   c. Nutrient density
   d. Food choices
   e. Moderation
   f. Calorie control
   g. Need for variety
5. A balance of food groups (vegetables, fruits, grains, meat, beans, oil, and milk), energy sources (proteins, fats, and carbohydrates), and nutrients (vitamins and minerals) is important.
6. A healthy balance matches the caloric intake with the activity expenditure.
7. Nutrient density is a ratio of nutrient content to energy content.

a. Nutrient-dense foods are high in vitamins and minerals and low in calories.

B. Weight assessment

1. According to a 2014 article in the *Journal of the American Medical Association*, 17% of children and teenagers and 35% of adults in the United States are obese.
2. Age is a considerable factor in weight fluctuations. As people age, obesity increases the risk of heart disease, stroke, diabetes, hypertension, metabolic syndrome, and some forms of cancer.
3. Unintended weight loss may be due to frailty, disability, or illness.
4. Being overweight or underweight can lead to an increase in morbidity and mortality.
5. Overweight or obesity
    a. Many factors are responsible for obesity. Some can be controlled; some cannot.
        i. Biologic, genetic, and lifestyle factors all influence the tendency to gain and maintain weight.
    b. Unlike biologic and genetic factors, lifestyle and behavioral factors that influence weight can potentially be altered.
        i. Lack of exercise
        ii. Eating out
        iii. Emotional eating
    c. The key to a healthy eating pattern is moderation.
        i. Including a variety of foods in the diet is a good plan for patients.
    d. Calorie control is difficult, as counting calories can be challenging for many people. Nevertheless, it is important for weight maintenance.
        i. There are a number of websites, apps, and devices devoted to tracking calories and physical activity, and the community paramedic can advise the patient to look into these resources.
6. Underweight
    a. Underweight people do not have the same risks as people with obesity except when the underweight condition is caused by being undernourished.
    b. Deficits in vitamins, minerals, and proteins can cause fatigue and compromised immune function.
    c. Factors that may lead to underweight:
        i. Biologic factors including loss of appetite or disinterest in eating
        ii. Metabolic or hereditary factors
        iii. Psychological eating disorders
        iv. Reaction to psychological or emotional stress
        v. Substance abuse
        vi. Underlying disease

C. Alcohol use

1. Chronic alcohol abuse:
   a. Can cause or exacerbate mental health disorders
   b. May interfere with nutrient absorption
   c. May cause damage to the lining of the gastrointestinal tract and esophagus
2. Because excess alcohol consumption contributes to poor eating habits and puts the patient at risk of being undernourished, it needs to be factored into the nutritional assessment by the nutritionist.

IX. Role of the Community Paramedic

A. The basic food plan

1. Written food plans can be created by nutritionists for:
   a. Scheduled eating
   b. Weight change processes
   c. Improved meal planning
2. Goals should be patient driven, achievable, and evaluated often.
3. For the community paramedic, the goal is working with patients to help make changes that will empower and motivate them.
   a. Identify ways to help patients achieve success without causing undue stress.
   b. Do not give them too many goals at one time.
   c. Have them explain in their own words what they understand to assess whether you need to reinforce certain concepts.

X. Implementing the Food Plan

A. Preparing yourself

1. Before you visit the patient, be prepared with as much information as you can gather from:
   a. The patient's plan of care
   b. Meetings with the health care team
   c. Medical records, if permitted
2. You want to know:
   a. The patient's medical diagnoses
   b. Which challenges the patient may have in terms of ability to perform activities of daily living
   c. The patient's medications and supplements
   d. The patient's lifestyle
   e. Attitude toward change

f. The goals for this patient and recommended ways to accomplish them via the food plan

3. You need to understand not only what the patient eats and drinks but whether nutritious food is available to the patient and whether the person is able to shop for and prepare such food.

B. Approaching the patient

1. The patient may feel some initial apprehension as he or she interacts with the community paramedic in a role usually associated with a nurse or a physician.
2. You can clarify that your role is to act as the "eyes and ears" of the physician, serving as part of the collaborative health care team that is assisting the patient in his or her recovery.
3. Gaining patients' participation will require good communication based on respect, trust, and a willingness to examine lifelong assumptions about food and diet.
4. Acknowledge and validate their feelings, and help them understand that your goal is to clarify serious risks to their health and help implement a plan to mitigate these risks.

C. Considering personal preferences

1. Personal food preferences need to be understood to create a functional food plan for a person.
2. On a very basic level, people choose foods based on taste, which may also incorporate smell and texture.
3. Food choices may also reflect customs, beliefs, and habits.
   a. In particular, family and culture are often factors that define which foods a person does or does not like.
   b. Religious observances may also determine what we eat and when.
4. Most of us are creatures of habit in terms of how frequently and at what times we eat.
5. Another consideration is the patient's budget for food.
6. Each food plan must be tailored to the individual patient by the nutritionist.
   a. If you discover a new piece of information while working with the patient, document this for consideration by the health care team.

D. Tools for the community paramedic

1. Food labels
   a. If necessary, community paramedics should educate patients on how to read and understand food labels.
   b. Federal regulations specify what can and what cannot go on a food label and which foods are required to carry such labels.
      i. Nutrition Labeling and Education Act (NLEA)
   c. Food labels are required to include five elements:
      i. A statement of identity

ii. The net contents of the package
iii. The name and address of the manufacturer
iv. The packer or distributor
v. A list of ingredients and nutritional information

d. Preservatives and additives must also be included, along with eight major food allergens:
i. Fish
ii. Soy
iii. Tree nuts
iv. Eggs
v. Wheat
vi. Peanuts
vii. Milk
viii. Crustaceans

e. Nutrition facts enable consumers to determine whether a product is nutritious and offers them a basis of comparison with other products.

f. Attention should be paid to:
i. Serving size
ii. Ingredient list
iii. Daily values (dietary standards that compare the amount of nutrients in a food to the amount recommended for daily consumption)
iv. Health claims

E. Education

1. Food safety
a. Most food-related diseases are caused by:
i. Microorganisms introduced by unclean hands and food preparation surfaces
ii. Insufficient cooking
iii. Failure to refrigerate foods properly

b. Such microorganisms may be bacteria, viruses, or even parasites.

c. People who are young, old, or immunocompromised are most seriously affected.

d. Foodborne illness occurs when there is a pathogen, a host, and some sort of interaction between the two that results from ingestion of a particular food.
i. Some infections are caused directly by a pathogen; others stem from a toxin produced by a pathogen.

e. Food contamination can occur at any point from the farm or ranch to the grocer's shelf to the consumer's plate.
i. Contamination can also occur in crop fields, during food processing, by unsanitary food handling, or during food preparation.

ii. Measures to ensure food safety include checking the expiration dates on foods and not opening cans that are bulging at the top.

2. Food storage
   a. When shopping or cooking:
      i. Separate raw, cooked, and ready-to-eat foods
      ii. Read the label of each product to identify its storage instructions
      iii. Refrigerate perishables as soon as possible, and make sure the refrigerator is set at the optimal temperature
3. Food preparation
   a. One of the most important steps patients can take to ensure food safety is to establish a safe and sanitary place to prepare food.
   b. Some simple habits can eliminate many of the risks associated with food preparation:
      i. Clean hands and cooking surfaces often, especially after handling raw foods and produce.
      ii. Clean fruits and vegetables with cold water before eating.
      iii. Refrigerate foods as soon as possible, and do not leave them out too long before cooking.
      iv. Defrost foods in the refrigerator rather than at room temperature.
      v. Avoid cross-contaminating foods.
      vi. Ensure food is cooked at the proper temperature to kill pathogens. Thoroughly cooking eggs, for example, will lessen the risk of Salmonella infection.
      vii. Avoid using unpasteurized milk or juice, raw sprouts, and undercooked meat or poultry.
      viii. Use a clean cutting board. To clean the cutting board, wash it with hot water, soap, and a scrub brush, and then sanitize it in a dishwasher or with a bleach solution.
      ix. Wash the tops of cans before opening them.
      x. Do not eat raw dough made with eggs.
      xi. Never place cooked food on the same surface where raw food was prepared without first washing the surface.
      xii. Refrigerate leftovers as soon as possible and date them so they will not be left too long.
4. Fluid balance
   a. Water is essential to all body functions. Without it, cellular metabolism is impaired.
   b. Older adults in particular should pay attention to how much water they consume, as they may have a reduced thirst response and/or reduced kidney function.

c. Patients should pay attention to their fluid intake and adjust it accordingly even when not driven by thirst.
d. How much fluid is enough depends on:
    i. Age
    ii. Size
    iii. Body composition
    iv. Activity level
    v. The weather
e. One measure of adequate hydration is the color of urine.

XI. Nutritional Needs of Older Adults

A. Factors affecting older adults' nutritional status

1. Age-related changes have a direct impact on nutritional requirements.
    a. Decreased muscle mass in older adults creates a need for higher consumption of high-quality protein.
    b. Decreased immune function creates a need for increased intake of vitamin B 6, antioxidants, vitamin E, zinc, and high-quality protein.
    c. Increased gastric pH calls for increased vitamin D.
    d. Decreased kidney function creates a need for increased fluids.
    e. Increased oxidative stress, potential cognitive impairment, and degenerative eye issues call for greater amounts of antioxidants such as beta-carotene, vitamin C, and vitamin E.
    f. Slowed gastric mobility means there is an increased need for fiber.

B. Medical conditions affecting older adults' nutritional status

1. Assessing mental health status is important in late adulthood.
2. Common medical conditions that affect older adults' nutritional status are:
    a. Depression
    b. Anorexia (loss of appetite)
    c. Alzheimer disease
    d. Arthritis
    e. Bowel and bladder regulations issues
    f. Dental health problems
    g. Vision issues
    h. Osteoporosis
    i. Weight issues
3. All of these conditions can occur in concert with chronic medical conditions, and all of them can affect the patient's ability to prepare, eat, and metabolize food.

C. Meeting the nutritional needs of older adults

1. Challenges to older people in terms of obtaining adequate nutrition may include:
   a. Economic factors (low or fixed income)
   b. Social isolation
   c. Physical restrictions
   d. Inability to shop for and prepare food
2. For those still living independently, services such as Meals on Wheels or other senior nutrition programs can be valuable in ensuring adequate nutrition.
3. As a community paramedic you should be aware of the various resources in your community.

XII. Nutritional Needs of Patients with Chronic Diseases

A. Dietary care should take into consideration all patient comorbidities.

1. They may affect nutritional requirements for the individual patient.
2. Often chronic medical conditions will involve special dietary considerations that may be new and unfamiliar to the patient.
3. The community paramedic should also consider how certain foods will interact with the patient's prescription medications and over-the-counter supplements.

B. Diabetes

1. According to the Centers for Disease Control and Prevention, 29.1 million people have diabetes and of those 29.1 million, 8.1 million are undiagnosed.
2. Stress, illness, obesity, lack of exercise, and a history of gestational diabetes increase the risk of developing diabetes, but the most certain predictive factor is family history.
3. Nutritional needs
   a. The typical Western diet, which contains too much fat and not enough fruits, vegetables, and fiber, raises a person's risk of developing diabetes.
      i. Exacerbated by the lack of exercise common in the Western culture
      ii. In particular, the risk of developing type 2 diabetes increases with weight gain, and the most significant factor in risk reduction is weight loss.
   b. Regular exercise improves carbohydrate and lipid metabolism, lowers blood pressure, and reduces the risk of heart disease.
   c. People with diabetes need to closely monitor their food intake.
   d. Well-balanced meals in the right amounts will help maintain healthy glucose blood levels.
   e. With diabetes, it is as important to monitor *how* one eats as much as *what* one eats.
   f. Consistent calorie and carbohydrate intake helps keep blood glucose from spiking or dropping.

4. Challenges
    a. With patients who have type 1 diabetes, challenges may be caused by the long-term effects of the disease, such as:
        i. Blindness
        ii. Nerve damage
        iii. Amputations
    b. Older adults with diabetes may also have other chronic diseases such as:
        i. Renal insufficiency
        ii. Chronic obstructive pulmonary disease
        iii. Heart disease
    c. Such comorbidities create a challenge for the community paramedic who is trying to address nutritional issues related to all of these different disease states.
    d. Some patients with chronic diabetes may have cognition and memory issues or may be depressed.
    e. Encourage and support healthy eating habits while honoring the dietary preferences of the patient.
5. Recommendations
    a. For patients with type 1 diabetes, the best management principles include:
        i. Healthy eating
        ii. Physical activity
        iii. Insulin by injection
        iv. Closely monitoring blood glucose concentration
    b. Patients with type 2 diabetes can also benefit from:
        i. Healthy eating
        ii. Physical activity
        iii. Blood glucose testing
        iv. Weight control is the single most important factor.
    c. In general, as a community paramedic working with patients with diabetes, you should address their nutritional needs based on:
        i. Personal and cultural preferences
        ii. Access to food options
        iii. Willingness to make behavioral changes

C. Chronic obstructive pulmonary disease

1. Chronic obstructive pulmonary disease (COPD) is a collective term that includes emphysema and chronic bronchitis.
2. Both of these conditions obstruct airflow into and out of the lungs, as a result of loss of elasticity and/or inflamed airways that may also be clogged with mucus.

3. Nutritional needs
    a. Nutritional goals for patients with emphysema revolve around providing adequate energy to minimize unwanted weight loss and loss of lean body mass and to prevent malnutrition.
    b. The patient's high energy needs can be met by following a healthy, balanced diet.
    c. Patients with chronic bronchitis have excess mucus secreting into their bronchial tubes, which may compromise breathing and lung capacity.
    d. Nutritional goals should be aimed at keeping the patient at a healthy weight, which will help to facilitate breathing and preventing malnutrition.
    e. The pulmonary status of patients with COPD may be improved by reducing carbon dioxide levels.
        i. Both carbon dioxide and carbon monoxide are produced by the metabolism of refined carbohydrates.
        ii. Patients should avoid sugary foods such as cereal, white bread, and large amounts of pasta or rice.
4. Challenges
    a. Weight is a common problem for patients with COPD, albeit in opposite ways for patients with emphysema and those with chronic bronchitis.
        i. Patients with emphysema tend to be underweight.
        ii. Patients with chronic bronchitis tend to be overweight.
    b. Good nourishment is necessary for patients with emphysema to meet their energy needs
    c. Patients with chronic bronchitis need to strive to keep off weight.
    d. A hallmark of COPD is retention of carbon dioxide, which will make a patient feel weak and tired.
    e. The consumption of foods that reduce carbon dioxide levels will, therefore, help keep their energy up and increase their quality of life.
    f. Symptoms commonly noted with COPD can interfere with eating or the enjoyment of eating:
        i. Dyspnea may interfere with swallowing and chewing or cause mouth breathing, which can alter the taste of food.
        ii. Chronic mucus production causes frequent coughing.
        iii. Certain medications may have side effects that interfere with a normal appetite and cause anorexia.
        iv. Loss of appetite may occur secondary to fatigue.
5. Recommendations
    a. Obese people with COPD need to manage their weight yet keep up their energy to deal with breathing problems.

b. They should eat three regular balanced meals but reduce snacking; make vegetables a large part of each meal; if they need a snack, make it fruit; and reduce intake of sugary and fatty foods.
c. The goal should be to deter weight gain and gradually lose the excess weight.
d. For patients who occasionally depend on oxygen, it may be beneficial to wear a cannula while eating, as both eating and digestion require extra oxygen.
e. When patients with COPD experience exacerbations of their disease, the following measures may prove helpful:
    i. Instead of eating large meals, eat smaller meals more frequently.
    ii. Consider softer foods that do not require much chewing. Consume with nutrient-rich drinks made with fortified milk.
    iii. Eat slowly and chew foods thoroughly to avoid swallowing air.

D. Congestive heart failure

1. Congestive heart failure (CHF) may occur after a myocardial infarction or as a result of diseased or damaged heart valves, coronary artery disease, or chronic hypertension.
2. Nutritional needs
    a. Increased energy needs of the heart and lungs along with a potential decrease in food intake secondary to early satiety and fatigue commonly lead to protein malnutrition in patients with heart failure.
    b. This combination can also lead to weight loss.
    c. The diet should include sufficient calories to maintain a healthy weight and should provide the protein needed for energy.
3. Challenges
    a. The most important nutritional care goals are to ensure adequate protein and monitor sodium and fluid intake, especially for patients suffering from CHF.
4. Recommendations
    a. CHF is a heart problem, so follow recommendations for a heart-healthy diet.
    b. Lowering fat and cholesterol intake means:
        i. Avoiding fatty cuts of meat
        ii. Avoiding fried foods
        iii. Eating more fish
        iv. Using fat-free and low-sodium milk and dairy products
        v. Eating mostly whole-grain cereals and breads
        vi. Using canola or olive oil
        vii. Limiting the use of mayonnaise, margarine, butter, and sour cream
    c. Patients should prefer consumption of:
        i. Poultry
        ii. Fruits
        iii. Green leafy vegetables

iv. Whole grains
v. Legumes
vi. Flaxseed
vii. Canola oil
viii. Soybeans

d. Nuts will increase the levels of beneficial omega-3 fatty acids, which:
   i. Inhibit platelet aggregation
   ii. Mute the inflammatory immune response
   iii. Act as mild vasodilator

E. Mental health

1. Mental health disorders are common in the United States.
2. In some cases, a mental health disorder is the primary condition; in other cases, they coexist with other illnesses.
   a. Example: A patient who is suffering from depression because of a debilitating health condition such as COPD.
3. Nutritional needs
   a. Omega-3 fatty acids may reduce the severity of some mental health conditions, such as:
      i. Alzheimer disease
      ii. Depression
      iii. Bipolar disorder
   b. Folate supplementation, in addition to medication, has been found to help reduce symptoms in patient with:
      i. Depression
      ii. Bipolar disorder
      iii. Schizophrenia
4. Challenges
   a. People living with mental illness may also be living with substance abuse disorders.
   b. As a community paramedic, you may not be able to change that behavior, but you should be aware of the nutritional deficiencies and medical conditions associated with abuse of specific substances.
   c. If the substance abuse causes periods of altered behavior, the patient may be unwilling or unable to shop, prepare food, and pay attention to nutritional needs.
   d. Although medications for mental disorders are helpful, their side effects can be problematic and may have implications for the patient's diet and nutritional status.
   e. Consult a medication reference guide to see if there are any potential food interactions with medications that the patient is taking.

5. Recommendations
    a. Because people with mental illness may have problems maintaining normal sleep patterns, caffeine intake should be limited to 1 to 2 cups per day and preferably limited to the morning hours to avoid sleep disruption.
    b. Neuroleptic medications can also cause constipation. Eating fruits, vegetables, and whole grains and ensuring good fluid intake will help patients avoid this problem.
    c. Patients with mental illness may need a more rigid food plan from the nutritionist.

XIII. Patients With Special Diets

A. Reasons for special diets include:

1. Personal preferences like vegetarianism or veganism
2. Religious dictates
3. Management of disease
4. Food allergies
5. Weight management

B. Vegetarian diets

1. Reasons people become vegetarians:
    a. An aversion to eating animal products
    b. Religious beliefs
    c. Environmental concerns
    d. Meat is not available.
    e. They believe a vegetarian diet is helpful.
2. Subgroups of vegetarians include:
    a. Lacto-ovo-vegetarians
    b. Vegans
    c. Fruitarians
    d. Pesco-vegetarians
    e. Similar diets include the Mediterranean, macrobiotic, and Paleolithic diets.
3. Vegetarian diets are beneficial in that they are low in fat and cholesterol and are high in magnesium and folate. Fresh fruits and vegetables provide higher amounts of antioxidants, as well as dietary fiber and phytochemicals.
4. Vegetarians are less likely to develop heart disease due to lower blood cholesterol levels. They also have lower incidence of prostate and colorectal cancer.
5. Nevertheless, vegetarian diets can be incomplete—especially the more restrictive ones.
6. The diets of vegans may be deficient in:
    a. Zinc

b. Calcium
c. Vitamin D
d. Riboflavin
e. Iron
f. Vitamin B_{12}

7. Fruitarian and macrobiotic diets may lack even more essential nutrients.

C. Strategies to assist patients with special diets

1. The key with any special diet is to get a clear picture of which dietary restrictions may exist and why.
2. You need to clarify the absolute "do's and don'ts" based on patient request.
3. If those mandates eliminate certain essential nutrients, the food plan from the nutritionist must consider alternative and acceptable ways to provide them.

D. Alternative sources of nutrients

1. Recommendations for vegetarians include specific amounts of:
   a. Grains
   b. Vegetables
   c. Legumes
   d. Nuts
   e. Other protein-rich foods
2. Those people who eat eggs and dairy products can more easily meet their need for protein.
3. Vegans who eat a variety of grains, vegetables, and legumes may also meet the protein requirement.
4. Besides choosing a variety of foods, other recommendations include:
   a. Choosing whole, unrefined foods
   b. Avoiding sweetened and fatty foods

Post-Lecture

Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (**date to be determined by instructor**).

B. Read Chapter 21, "Pharmacology," for the next class session.

Chapter 21
Pharmacology

Unit Summary

After students complete this chapter and the related course work, they will be able to describe the community paramedic's role medication inventory and compliance, and be able to identify categories of medications used for and potential side effects of certain diseases/disorders, such as inflammatory bowel disease and diabetes; cardiovascular disorders, including hypertension, congestive heart failure, coagulation disorders, and elevated cholesterol; respiratory disorders, including chronic obstructive pulmonary disease and asthma; psychiatric disorders, including depression, anxiety, bipolar disorder, and schizophrenia; attention-deficit/hyperactivity disorder; central nervous system disorders, including seizure disorders and chronic pain; and viral infections.

Objectives

1. Describe the community paramedic's role in medication inventory and compliance. (pp 385-386)
2. Identify the categories of medications used for managing diabetes. (pp 387-388)
3. Describe the potential side effects of the medications used for managing diabetes. (pp 387-388)
4. Identify categories of medications used for managing inflammatory bowel disease. (pp 388-389)
5. Describe the potential side effects of the medications used for managing inflammatory bowel disease. (pp 388-389)
6. Identify the categories of medications used for managing cardiovascular disorders, including hypertension, congestive heart failure, coagulation disorders, and elevated cholesterol. (pp 390-398)
7. Describe the potential side effects of the medications used for managing cardiovascular disorders. (pp 390-398)
8. Identify the categories of medications used for managing respiratory disorders, including chronic obstructive pulmonary disease and asthma. (pp 399-405)
9. Describe the potential side effects of the medications used for managing respiratory disorders. (pp 399-405)
10. Identify the categories of medications used for managing psychiatric disorders, including depression, anxiety, bipolar disorder, attention-deficit/hyperactivity disorder and schizophrenia. (pp 405-412)

11. Describe the potential side effects of the medications used for managing psychiatric disorders. (pp 405-412)
12. Identify the categories of medications used for managing central nervous system disorders, including seizure disorders and chronic pain. (pp 412-418)
13. Describe the potential side effects of the medications used for managing central nervous system disorders. (pp 412-418)
14. Identify categories of medications used for managing viral infections. (pp 418-420)
15. Describe the potential side effects of the medications used for managing viral infections. (pp 418-420)

Readings and Preparation

- Review all instructional materials including ***Community Health Paramedicine***, Chapter 21, and all related presentation support materials.
- Review local protocols relating to the community paramedic's role in inventory and compliance, managing and administering medications for diseases such as inflammatory bowel disease, diabetes, hypertension, congestive heart failure; coagulation disorders, and elevated cholesterol, chronic obstructive pulmonary disease, asthma; psychiatric disorders, such as depression, anxiety, bipolar disorder, and schizophrenia; attention-deficit/hyperactivity disorder; seizure disorders, chronic pain; and viral infections.

Support Materials

- Lecture PowerPoint presentation

Enhancements

- Direct students to visit Navigate 2.
- Provide copies of local protocols.

Unit Activities

Writing assignments: Instruct each student to put together a scenario for pharmacology.

Student presentations: Divide students into groups. Instruct each group to act out the scenario for pharmacology (developed for the writing assignment) for the rest of the class.

Group activities: Discuss and critique each student presentation as a group. Discuss problems regarding the community paramedic's role in inventory and compliance, categories of medications used for inflammatory bowel disease, diabetes, cardiovascular

disorders, respiratory disorders, psychiatric disorders, central nervous system disorders, viral infections, and attention-deficit/hyperactivity disorder and the potential side effects of the medications used to manage these disorders.

Pre-Lecture

You are the Community Paramedic

"You are the Community Paramedic" is an opening case study that encourages critical thinking skills.

Instructor Directions

1. Direct students to read the "You are the Community Paramedic" scenario found a the beginning of Chapter 21.
2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question.
3. You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. Pharmacologic therapy

1. Pharmacologic therapy is a key component of the plan of care for many patients.
2. Medications are prescribed on a:
   a. Long-term basis for chronic diseases
   b. Short-term basis (eg, postoperatively, for disease flare-ups, or for acute illnesses)
3. Many patients may use multiple medications (polypharmacy).
4. General paramedic training and practice will have made the community paramedic familiar with the various categories of medications and the diseases and conditions for which they are used.
5. The community paramedic will *not* prescribe such medications; however, they do:
   a. Take medication inventories
   b. Review medications included in the plan of care
   c. Monitor the patient (ie, health care provider's eyes and ears)

6. Medications for chronic diseases generally do not cure the condition, but rather seek to manage it.
    a. Their use may require a trade-off between benefits being conferred by the pharmacologic agent and the side effects of that medication.

II. Medication Inventory and Compliance

A. The community paramedic's role in medication compliance

1. The community paramedic plays a vital role in medication compliance.
2. Medication inventory (or medication reconciliation) is the process for creating the most up-to-date and accurate list of a patient's current medications, including:
    a. Prescription medications
    b. Herbal supplements
    c. Vitamins
    d. Over-the-counter medications
    e. Vaccines
    f. Parenteral nutrition
    g. Blood derivatives
    h. Intravenous solutions
3. The community paramedic should note:
    a. If any medications in the home are expired
    b. The dosages
    c. How frequently the patient takes the medication.
4. The overall intent in completing a medication inventory is to help identify errors due to:
    a. Duplication
    b. Incorrect dosing or timing
    c. Adverse interactions

B. Medication compliance

1. The community paramedic should assist patients in organizing their medications to adhere to the patient's plan of care. Common methods include:
    a. Using a manual pill organizer or an electric pill organizer
    b. Labeling and organizing medications on an accessible shelf
    c. Using multiple colored highlighters to differentiate between medications
    d. Using a chart or dry-erase board to record medication schedules
    e. Using a medication tracker app
    f. Enlisting a family member or friend to help dispense medications to the patient or accessing an outreach service

2. Ensure that the patient has an adequate supply of medication on hand. The community paramedic should:
    a. Link the patient to the most appropriate outreach service if the patient is running low
    b. Confirm that the patient has an appropriate transportation resource to obtain medications
3. The community paramedic should also educate the patient on the medications prescribed, including:
    a. The indication for the medication
    b. Dosage
    c. Frequency
    d. Expected effects
    e. Potential side effects

III. Endocrine Medications Overview

A. Endocrine system

1. The endocrine system is a specialized network of glands that produce and release hormones into the blood that help to control certain body functions. These glands include:
    a. Thyroid
    b. Pancreas
    c. Pituitary
    d. Ovaries
    e. Testes
2. Endocrine disorders occur when a gland either:
    a. Produces too much or too little of an endocrine hormone
    b. When a lesion (a nodule or a tumor) develops
3. The endocrine system plays a vital role in determining whether a person will develop a disorder related to hormonal imbalances, such as:
    a. Thyroid disorder
    b. Diabetes
    c. Growth disorder
    d. Sexual dysfunction
    e. Other disorders related to hormonal imbalances
4. Medications can control the symptoms of these disorders and may restore normal health to affected people.

B. Managing diabetes

1. Diabetes mellitus occurs when:
    a. The pancreas does not secrete insulin

   b. Cells are insulin resistant and unable to use circulating insulin
2. Treatment may include:
   a. Oral or injectable hypoglycemic medications
   b. Replacement with insulin
   c. Both
3. All oral hypoglycemic medications and insulin have the goal of normalizing blood glucose levels in people living with diabetes.
   a. Insulin comes in many formulations with differing durations of effect; it may be ultra-short acting, short acting, intermediate acting, or long acting.
4. At present insulin can be delivered only by subcutaneous injection or intravenously.
5. Lack of insulin leads to a predictable set of metabolic derangements culminating in diabetic ketoacidosis, which, if not treated promptly, can lead to coma and death.
6. Insulin needs change from day to day depending on:
   a. Activity levels
   b. Dietary intake
   c. Diet composition
   d. Other factors such as growth spurts (in children) or pregnancy (in adult women)
7. Intravenous delivery is used only in emergencies, when the patient develops a:
   a. Hyperglycemic crisis
   b. Ketoacidosis
8. Insulin is self-delivered, either by:
   a. Intermittent subcutaneous injection
   b. Continuous infusion pump
9. Dosing and frequency of insulin administration are usually based on:
   a. Blood glucose test results
   b. Diet
   c. Expected exercise
10. The community paramedic's assessment of such people should include:
   a. A review of the patient's blood glucose logs
   b. Looking for signs of depression
   c. Determining if there are obstacles to obtaining needed supplies

C. Oral and injectable hypoglycemic medications

1. Hypoglycemic medications may be used:
   a. When the pancreas secretes some insulin but not enough to meet the body's needs

   b. When the body is unable to use the insulin that is present due to insulin resistance
2. Almost all such medications are used as single agents in combination with diet and exercise when treating diabetes.
3. Several categories of hypoglycemic medications are available:
   a. Insulin secretagogues
   b. Insulin sensitizers
   c. α-Glucosidase inhibitors
   d. Glucagon-like peptide agonists
4. Insulin secretagogues
   a. Used primarily in type 2 diabetes
   b. Medications that stimulate the beta cells in the pancreas to make more insulin, enabling it to overpower cellular insulin resistance
   c. Some of these medications may also be used in gestational diabetes if they do not cross the placental barrier.
5. Common adverse effects are related to hypoglycemia, which is usually the effect of too much medication or inadequate carbohydrate intake. These signs and symptoms can include:
   a. Shakiness
   b. Nervousness/anxiety
   c. Clamminess
   d. Sweating
   e. Confusion
   f. Irritability
   g. Dizziness
   h. Tachycardia
   i. Nausea
   j. Sleeplessness
   k. Slurred/impaired vision
   l. Headache
   m. Fatigue
   n. Seizures
   o. Unconsciousness
6. The insulin secretagogue class of medications is primarily composed of sulfonylureas and meglitinides, including nateglinide (Starlix) and repaglinide (Prandin).
7. Both sulfonylureas and meglitinides promote the release of insulin to raise insulin levels.
   a. Their secondary effects include:
      i. Suppression of glucose release

    ii. Insulin clearance in the liver
8. The main side effects of insulin-releasing medications are signs and symptoms associated with hypoglycemia and weight gain.
9. Insulin sensitizers
    a. Insulin-sensitizing agents, which include biguanides and thiazolidinediones, cause the body to:
        i. Need less insulin
        ii. Use available insulin more effectively in patients who are insulin resistant
    b. The most commonly used biguanide is metformin (Glucophage).
    c. Currently, only one thiazolidinedione— pioglitazone (Actos)—is on the market; a second thiazolidinedione, rosiglitazone (Avandia), is no longer in general use due to concerns about its cardiac side effects.
    d. Biguanides and thiazolidinediones act differently from sulfonylureas in that:
        i. Instead of causing more insulin to be released
        ii. They block glucose from entering the blood by decreasing glucose production from the liver and reducing glucose absorption in the intestines.
    e. Both biguanides and thiazolidinediones are effective in controlling blood glucose, but metformin has a superior safety profile.
    f. For this reason:
        i. Metformin formulations are frequently part of the first-line treatment of type 2 diabetes, along with diet and exercise
        ii. While pioglitazone is used in those patients who do not respond well to metformin.
    g. The main side effects of insulin sensitizers include gastrointestinal (GI) upset (nausea, vomiting, diarrhea, flatulence), swelling due to fluid retention, and anemia.
10. α-Glucosidase inhibitors
    a. Like insulin sensitizers, α-glucosidase inhibitors block absorption of glucose in the digestive tract, thereby reducing insulin requirements.
    b. The two medications in this class that are currently available in the United States are acarbose (Precose) and miglitol (Glyset). These are:
        i. Taken with meals to limit glycemic rises
        ii. Can be used for both type 1 and type 2 diabetes in patients in whom hyperglycemia is the primary concern
    c. The main side effect of glucosidase inhibitors is GI upset (flatulence).
11. Incretin mimetics
    a. Incretins are hormones secreted by the intestine in response to food passing through this part of the GI tract.
    b. One incretin in particular—glucagon-like peptide-1 (GLP-1):
        i. Promotes insulin release in the pancreas

ii. Slows glucose absorption in the gut
iii. Suppresses release of glucagon, a pancreatic hormone that elevates the release of glucose by the liver.

c. A synthetic incretin, exenatide (Byetta):
i. Lowers overall glucose levels
ii. Suppresses appetite
iii. Available only in injectable form
iv. Carries a risk of inducing hypoglycemia

d. The main side effects of incretin mimetics include hypoglycemia, nausea, diarrhea, abdominal pain, and upper respiratory infection.

IV. Gastrointestinal Medications Overview

A. GI system

1. The GI tract, which is divided into upper and lower portions, is responsible for:
   a. The absorption of nutrients and water in the body
   b. The elimination of waste
2. GI diseases involve one or more segments of the GI tract, including the:
   a. Esophagus
   b. Stomach
   c. Small intestine
   d. Large intestine
   e. Rectum
   f. Accessory organs that aid in digestion (ie, the liver, gallbladder, and pancreas)
3. Conditions that interfere with the GI tract's ability to function properly will cause disorders that can produce:
   a. Nausea
   b. Vomiting
   c. Indigestion
   d. Ulcers
   e. Diarrhea
   f. Constipation
   g. Malnutrition

B. Managing inflammatory bowel disease

1. Inflammatory bowel disease (IBD) comprises two conditions:
   a. Ulcerative colitis
   b. Crohn disease
2. Because the etiology and the pathogenesis of IBD remain unclear, the pharmacologic management of IBD is varied and complex.

3. Treatment for IBD: to maintain patients during long periods of remission, patients use a combination of:
    a. Medications
    b. Nutritional support
4. Three main groups of medications are used in the management of IBD (ie, ulcerative colitis and Crohn disease):
    a. Aminosalicylates
    b. Corticosteroids
    c. Medications that affect the immune system, such as:
        i. Immunosuppressants
        ii. Purine analogs
        iii. Methotrexate
        iv. Monoclonal antibodies
        v. Anti-tumor necrosis factor agents
        vi. Anti-integrin agents

C. Aminosalicylates

1. Aminosalicylates are administered to prevent exacerbation of:
    a. Ulcerative colitis
    b. Crohn disease
2. The action of these medications is thought to work on the cells lining the intestine by changing the way these cells release cytokines.
    a. The cytokines are thought to influence the cells' behavior such that inflammation of the intestine is reduced.
3. Most aminosalicylate formulations are well tolerated. The most common adverse effects reported with olsalazine use include:
    a. Secretory diarrhea
    b. Subtle renal tubular changes
    c. Interstitial nephritis (rare)
    d. Hypersensitivity reactions (rare)
4. Sulfasalazine is associated with a higher incidence of adverse effects, including:
    a. Nausea
    b. GI upset
    c. Headache
    d. Malaise
    e. Arthralgias
    f. Myalgias
    g. Bone marrow suppression
5. Hypersensitivity reactions to sulfapyridine may cause:
    a. Myalgias

b. Fever
c. Exfoliative dermatitis (erythema and scaling of the skin)
d. Pancreatitis
e. Pneumonitis
f. Hemolytic anemia
g. Pericarditis
h. Hepatitis

6. There are no significant medication–medication interactions documented with aminosalicylates.

D. Glucocorticoids

1. Glucocorticoids are commonly used as:
   a. Treatments for patients with active IBD
   b. To reduce inflammation
2. Prednisone and prednisolone are the oral glucocorticoids most commonly used for this indication.
   a. Topical hydrocortisone formulations are used to maximize the colonic tissue effects and minimize systemic absorption.
   b. A potent synthetic analog of prednisolone, budesonide, is also available in a controlled-release oral formulation.
3. The most common side effects include:
   a. High blood pressure
   b. Increased risk of infection
   c. Weight gain
   d. Acne
   e. Increased facial hair
   f. Mood swings
   g. Hyperglycemia
   h. Insomnia
4. The undesirable side effects associated with glucocorticoids mainly depend on the:
   a. Dosage used
   b. Frequency

E. Purine analogs

1. Purine analogs, including azathioprine and 6-mercaptopurine (6-MP), have well-recognized:
   a. Anticancer properties
   b. Immunosuppressive properties
2. Purine analogs are also used in patients with IBD who:
   a. Are unresponsive to aminosalicylates or glucocorticoids

   b. Relapse when glucocorticoids are withdrawn
3. Azathioprine is a prodrug that is metabolized to 6-MP by the liver.
   a. Prodrug is a chemical compound that is pharmacologically inactive in its dosage form; following administration, it requires the body to metabolize the medication.
4. Dose-dependent adverse effects caused by azathioprine and 6-MP include:
   a. Nausea
   b. Vomiting
   c. Bone marrow suppression
   d. Hepatic toxicity
5. Routine complete blood counts and hepatic function tests are important for all patients who receive these medications.
6. Hypersensitivity reactions to azathioprine and 6-MP include:
   a. Fever
   b. Rash
   c. Pancreatitis
   d. Diarrhea
   e. Hepatitis
7. Allopurinol can be used:
   a. When patients do not respond to azathioprine or 6-MP therapy
   b. To prevent overproduction of uric acid, which leads to gout or kidney stones
8. Adverse effects of purine analogs can include:
   a. Fever
   b. Skin rash
   c. Hepatitis
   d. Worsened renal function
   e. Stevens-Johnson syndrome

F. Methotrexate

1. Like other immunosuppressants, methotrexate is an antimetabolite that breaks down folic acid.
   a. It is often able to induce and maintain remission in patients with Crohn disease.
   b. Its efficacy in ulcerative colitis is less certain.
2. Higher doses of methotrexate used to treat IBD may cause the same severe adverse effects as when higher doses of this agent used for chemotherapy, including:
   a. Bone marrow suppression
   b. Megaloblastic anemia
   c. Alopecia

   d. Mucositis
3. Folic acid supplementation reduces the incidence of adverse effects.
4. The effectiveness of methotrexate is reduced if taken with caffeine-containing foods, such as:
   a. Coffee
   b. Tea
   c. Chocolate
   d. Cola
5. Liver dysfunction can develop in patients who use alcohol while taking the medication.
6. Some over-the-counter medications interact with methotrexate, including:
   a. Various nonsteroidal anti-inflammatory medications (NSAIDs)
7. Patients receiving methotrexate therapy should:
   a. Not use over-the-counter medications without first consulting their prescriber
   b. Report any adverse effects immediately

G. Anti-tumor necrosis factor therapy

1. Anti-tumor necrosis factor agents target an inflammation-causing substance called tumor necrosis factor (TNF).
2. For patients who have shown an inadequate response to conventional treatment, three agents have been approved for acute and chronic treatment of patients with IBD:
   a. Infliximab (Remicade)
   b. Adalimumab (Humira)
   c. Certolizumab (Cimzia)
3. The most significant side effects associated with anti-TNF agents are:
   a. An increased risk of infection
   b. Congestive heart failure
   c. Skin cancers

H. Anti-integrin therapy

1. Integrins, cell adhesion receptors that bind to various types of ligands, play an important role in the pathogenesis of IBD.
2. Natalizumab (Tysabri) is an antibody targeted against integrins.
   a. It blocks the interaction of integrins with selectin, a type of cell adhesion molecule,
   b. Thereby preventing leukocyte migration into surrounding tissue
   c. In turn, this effect prevents IBD from progressing as part of the chronic disease process.

3. Natalizumab:
    a. Was approved by the FDA in 2008 for patients with moderate to severe Crohn disease
    b. Is administered intravenously every 28 days and is believed to work by reducing the ability of inflammatory immune cells to attach to and pass through the cell layers lining the intestines
    c. Adverse effects include:
        i. Hepatotoxicity (liver damage) in the form of increased bilirubin and liver enzyme levels
        ii. Fatigue
        iii. Allergic reactions
        iv. Headache
        v. Nausea
        vi. Fever
        vii. Exacerbation of Crohn disease possible

V. Cardiovascular Medications Overview

A. Cardiovascular disease

1. Cardiovascular disease is the leading cause of death for both men and women in the United States.
    a. Many types of cardiovascular disease are controlled with medications.
    b. Community paramedics are likely to encounter patients with some form of cardiovascular disease, especially hypertension.

B. Managing hypertension

1. The seventh report of the Joint National Committee (JNC 7) defines and classifies a normal blood pressure as:
    a. A resting systolic blood pressure less than 120 mm Hg
    b. A resting diastolic blood pressure less than 80 mm Hg
2. Prehypertension is defined as:
    a. A resting systolic value in the range of 120 to 139 mm Hg and/or
    b. A diastolic value in the range of 80 to 89 mm Hg
3. To be diagnosed with hypertension, a person must have:
    a. Three blood pressure readings above 140/90 mm Hg
4. Results from the Framingham Heart Study: Prehypertension was associated with:
    a. An increased risk of myocardial infarction (MI; heart attack)
    b. Coronary artery disease
5. Uncontrolled hypertension carries an even greater risk of a wide range of diseases, including:
    a. MI

   b. Coronary artery disease
   c. Stroke
   d. Kidney disease
   e. Aortic aneurysm
   f. Heart failure
6. Hypertension is addressed with any of a variety of antihypertensive medications, including medications in the following categories:
   a. Angiotensin-converting enzyme inhibitors
   b. Angiotensin II receptor blockers
   c. Direct renin inhibitors (DRIs)
   d. Aldosterone antagonists
   e. β-blockers
   f. α_1-blockers
   g. Calcium-channel blockers
7. The various classes of medications used to lower blood pressure are named for their mechanism of action.
   a. To understand why, one must understand how these processes influence cardiovascular function.
   b. For the most part, the medications discussed here prevent one or more of these systems from activating processes that raise blood pressure, thereby producing a lower average blood pressure value.
8. There are three ways to lower blood pressure:
   a. Lower cardiac output, generally by reducing fluid volume
   b. Reduce heart rate, generally by inhibiting signals that normally increase heart rate
   c. Decrease systemic vascular resistance, generally by expanding or dilating blood vessels
      i. Most of the medications used in therapy for hypertension alter one or more of these factors.
9. Altering the autonomic nervous system's signaling
   a. Blockade of β-receptors
      i. When β-adrenoceptors, also called β-receptors, are stimulated
      ii. Result is increased automaticity in the heart's sinoatrial (SA) node and
      iii. Increased velocity of conduction through the atrioventricular (AV) node
      iv. This effect leads to a higher heart rate as well as increased myocontractility
      v. Effect produces more forceful contractions of the heart
   b. One way to reduce blood pressure is to restrict the ability of norepinephrine and epinephrine to bind to β-adrenoceptors, which in turn results in reduced heart muscle contractility and lower cardiac output.

c. β-blockers accomplish this by blocking the β-adrenoceptors so norepinephrine and epinephrine cannot bind to them.
d. Many of the medications in this class have additional effects that result in further reduction of blood pressure.
e. β-Blockers are further classified by their specific receptor binding profile:
    i. *Nonselective* β-*blockers* block both types of β-receptors (and generally work in all tissues, not simply in the heart).
    ii. *Mixed* α_1/β-*blockers* not only block both β-receptors but also act upon α_1-adrenergic receptors (whose blockade leads to vasodilation).
    iii. *Selective* β-*blockers* block β_1-receptors but not β_2-receptors and may also be selective about which tissues they act upon (ie, they act in cardiac tissue but not on other organs)
f. These medications are also organized into three generations:
    i. *First-generation* β-*blockers* are nonselective and block both β_1- and β_2-receptors throughout the body.
    ii. *Second-generation* β-*blockers* are cardioselective medications that block only the β_1-receptors at normal dosages.
    iii. *Third-generation* β-*blockers* are typically mixed α_1/ β-blockers; thus, they are nonselective.
g. Most of the research shows that β-blockers are not necessarily the best first-line treatments for hypertension, many other conditions can be addressed by the blockade of β-receptors, including:
    i. Patients requiring long-term treatment of angina, coronary artery disease, heart failure, and dysrhythmias
    ii. Patients who have recently experienced an MI
    iii. Prevention of migraine headaches and anxiety attacks
h. In patients who have hypertension along with one or more of these other conditions, β-blockade can offer a “two-for-one” option to potentially address both conditions simultaneously.
i. Abrupt discontinuation of a β-blocker can put the patient at increased risk for:
    i. A significant cardiovascular event
    ii. Death
j. Gradual tapering of the β-blocker will reduce this risk.
k. Side effects
    i. Depression
    ii. Fatigue
    iii. Sexual dysfunction
l. Education of patients should emphasize taking these medications with water as opposed to orange or grapefruit juice, which reduces the bioavailability of the medication.
m. Blockade of α_1-receptors

i. Medications in this class include terazosin (Hytrin), doxazosin (Cardura), and prazosin (Minipress).

n. When α-blockers are used to treat hypertension, the effect of blocking constriction of the arterioles and veins has the most significant impact on lowering blood pressure.

o. Patients who may benefit from α_1-antagonist therapy include:
   i. Those with hypertension and benign prostatic hypertrophy
   ii. These agents are also often the medications of choice for hypertensive crisis caused by pheochromocytoma, an adrenal gland tumor that causes hypersecretion of catecholamines.

p. Side effects
   i. Weakness
   ii. Dizziness
   iii. Syncope

q. Education of patients should include advising patients who use these medications:
   i. Not to sit or stand up from a lying position too quickly
   ii. About the potential for a "first-dose effect," characterized by severe hypotension

10. Altering the renin−angiotensin−aldosterone system
    a. The renin–angiotensin–aldosterone system (RAAS) is a hormone system that regulates blood pressure and water (fluid) balance.
    b. In addition to blocking α- and β-receptors, the second mechanism by which antihypertensive medications act to lower blood pressure is suppression of angiotensin II activity in the RAAS.
    c. Hypertension is often a self-sustaining condition:
       i. Systemic vasoconstriction leads to increased renin production in the kidneys
       ii. Which in turn raises the circulating level of angiotensin I
    d. Angiotensin II, which is created by the conversion of angiotensin I by angiotensin-converting enzyme (ACE), is the product that causes:
       i. Potent vasoconstriction
       ii. Release of aldosterone
    e. There are several medications that reduce the activity of angiotensin II:
       i. Direct renin inhibitors
       ii. ACE inhibitors
       iii. Angiotensin II receptor blockers (ARBs)
    f. Direct renin inhibitors
       i. DRIs bind with the enzyme renin to form a "renin–medication complex" that renders the renin enzyme "inactive" and effectively lowers the amount of renin enzyme present in the RAAS.

ii. "Holy grail" of hypertension therapy: Limiting renin production because the increase in renin secretion that accompanies hypertension tends to promote blood pressure increases

g. The class of DRI medications is new and currently, only one DRI is available—aliskiren (Tekturna), which was approved for use in 2007.

h. ACE inhibitors
   i. By limiting the production of ACE, these medications permit less conversion of angiotensin I to angiotensin II than would otherwise be possible.
   ii. The effects of angiotensin II are thereby lessened.
   iii. This leads to lower blood pressure.

i. In addition to converting angiotensin I to angiotensin II, ACE breaks down bradykinin, a substance that causes vasodilation.

j. Patients who are most likely to benefit from ACE inhibitor therapy include those with:
   i. Hypertension
   ii. Diabetic and nondiabetic nephropathy
   iii. Coronary artery disease
   iv. Heart failure
   v. A history of an MI

k. The main adverse effects of ACE inhibitors can be grouped into two categories:
   i. Effects that are likely caused by the reduction in angiotensin II formation (hypotension, renal failure, and hyperkalemia)
   ii. Effects that are thought to be related to increased kinins (cough, angioedema, and anaphylaxis reactions)

l. Side effects
   i. Weakness
   ii. Dizziness
   iii. Syncope

m. There can also be a "first-dose effect"

n. Extra caution and monitoring are warranted when ACE inhibitor therapy is used in:
   i. Patients with renal insufficiency or diabetes
   ii. Those receiving hemodialysis
   iii. Those taking other medications that can cause elevated potassium levels, such as a potassium-sparing diuretic

o. A dry, "hacking" cough has been reported in 5% to 20% patients receiving ACE inhibitors.
   i. Patients can be switched to an ARB medication, which has a much lower incidence of associated cough.

p. Angiotensin II receptor blockers
q. When receptors are blocked by ARB medications:
    i. Angiotensin II cannot bind to them
    ii. Less vasoconstriction and volume expansion occur than would be present without the medication
    iii. This leads to lower blood pressure.
r. Patients who may benefit from ARB therapy include those with:
    i. Hypertension
    ii. Diabetic and nondiabetic nephropathy
    iii. Coronary artery disease
    iv. Heart failure after developing MI
    v. Scleroderma (chronic connective tissue disease)
s. Aldosterone antagonists
t. Final option available for interrupting the RAAS feedback loop is aldosterone agonists (AAs)
u. Two such medications are available:
    i. Eplerenone (Inspra)
    ii. Spironolactone (Aldactone)
v. The AAs work slightly differently in altering the RAAS than do the DRIs, ACE inhibitors, and ARBs.
w. AA medications:
    i. Block some of the aldosterone receptors
    ii. Prevent aldosterone from signaling the kidneys to conserve water
    iii. Thereby allowing excess fluid to be excreted as urine (diuresis)
    iv. There is also increased potassium retention and less sodium retention and volume expansion than would have occurred without the medication
    v. Blood pressure is lowered
x. AAs block the aldosterone receptors, which:
    i. Decreases sodium and water reabsorption
    ii. Increases potassium retention
y. Thus, hyperkalemia is a risk with these medications.
z. Side effects include:
    i. Nausea
    ii. Vomiting
    iii. Stomach cramps
    iv. Diarrhea
    v. Breast enlargement or tenderness, especially in men (rare)

11. Calcium-channel blockers
    a. The last major class of antihypertensive medications are actually not antihypertensives at all.
    b. Calcium-channel blockers (CCBs): more of a broad-spectrum vascular smooth muscle relaxant of sorts that can be exploited to provide benefits to the heart and the cardiovascular system as a whole.
    c. Blocking calcium channels helps lower cardiac output by:
        i. Reducing the force of contraction
        ii. Decreasing the frequency of contractions
    d. In the arteries, CCBs impede the smooth muscle of the arterial walls from contracting (constricting), which means the muscles relax and the arteries dilate.
    e. In sum, CCBs act on all three of the factors related to blood pressure:
        i. Cardiac output
        ii. Systemic vascular resistance
        iii. Heart rate
    f. CCBs are used to treat:
        i. Hypertension
        ii. Chest pain
        iii. Cardiac dysrhythmias
    g. Three subclasses of CCBs are used to treat chest pain and hypertension:
        i. Dihydropyridines
        ii. Phenylalkylamines
        iii. Benzothiazepines
    h. The phenylalkylamines and benzothiazepines may be given intravenously for:
        i. Atrial fibrillation
        ii. Atrial flutter
        iii. Supraventricular tachycardia
    i. The longer-acting CCBs are indicated for late-adult patients with isolated systolic hypertension and one of the following coexisting conditions:
        i. Angina pectoris
        ii. Raynaud phenomenon
        iii. Asthma
        iv. COPD
        v. Older adults who have not responded to other medications.
    j. Side effects:
        i. Hypotension
        ii. Headache
        iii. Weakness

iv. Dizziness
v. Edema of the ankles and feet (peripheral edema)

k. Some specific effects are associated with particular classes of CCBs.
i. Dihydropyridines may cause reflex tachycardia due to arterial dilation
ii. Large doses of short-acting nifedipine may increase the mortality of patients immediately following an MI.
iii. Phenylalkylamines and benzothiazepines reduce arterial pressure without inducing as much reflex tachycardia as do the dihydropyridines
iv. Constipation is also a concern with this group of medications.

12. Diuretics
a. One way to reduce blood pressure is to lower the fluid volume in the circulatory system.
b. Diuretics ("water pills"):
i. Cause the kidneys to remove greater amounts of salt and water from circulation
ii. This lowers the fluid volume
c. Some diuretic medications (ie, thiazides) also relax the walls of blood vessels, reducing:
i. Cardiac output
ii. Systemic vascular resistance.
d. Several types of diuretics are available for treating hypertension:
i. Thiazide diuretics
ii. Potassium-sparing diuretics
iii. Loop diuretics
e. As a class, diuretic medications are attractive because they are well tolerated and can be combined with:
i. β-blockers
ii. ACE inhibitors
iii. ARBs
iv. Centrally acting agents
v. CCBs
f. Not all subtypes of diuretics behave in the same manner, so close attention should be paid to a medication's subclass and mechanism of action.
g. Thiazide diuretics
i. Prescribed because they have a long history of safe, successful use for hypertension
ii. They are inexpensive; they are easy to use and have minimal side effects, which means patients are more likely to take them as prescribed.

iii. Just as effective in reducing cardiovascular events in patients with hypertension as β-blockers and ACE inhibitors, and they are better than either of those two classes in reducing stroke.
iv. Successful in treating African American patients, in whom they tend to be the first-line therapy
v. Promote potassium loss and are thought to increase the risk of new-onset diabetes, especially when combined with β-blockers

h. Loop diuretics
i. Loop diuretics get their name from the loop of Henle in the kidney, which is where they have their effects.
ii. These agents bind to a carrier protein in the loop of Henle that transports sodium, chloride, and potassium ions; by doing so, they prevent sodium chloride (salt) as well as water from being reabsorbed, thereby lowering fluid volume.
iii. Loop diuretics can reduce water reabsorption substantially more than can thiazide diuretics.

i. Side effects
i. Dizziness associated with hypotension
ii. Electrolyte imbalances
iii. Potassium loss
iv. Hypokalemia

j. Furosemide (Lasix) is perhaps the best-known medication in this class; it is much more often prescribed for congestive heart failure.

k. Potassium-sparing diuretics
i. Do not act on sodium transport mechanisms, so they avoid the problems associated with potassium loss.
ii. Two medications in this class, spironolactone and eplerenone, are AAs, and produce a diuretic effect by that mechanism.
iii. The other two members of this class, amiloride (Midamor) and triamterene (Dyrenium), act directly on sodium channels and do not promote excretion of potassium.

l. Side effects
i. Hyperkalemia
ii. GI disturbances (eg, nausea, vomiting, diarrhea, and anorexia)
iii. Impotence and sexual dysfunction (spironolactone and triamterene)
iv. Interaction with concomitant use of trimethoprim–sulfamethoxazole (TMP-SMX; Bactrim) antibiotic therapy, which acts similarly on the distal tubules as a potassium-sparing diuretic.

C. Managing congestive heart failure

1. Congestive heart failure (CHF) is a progressive disease in which the heart is unable to pump with sufficient force to push blood through the blood vessels.

2. When this happens:
    a. Fluid backs up in the vessels and leaks into the tissues and organs, particularly the lungs.
    b. This leads to the shortness of breath and "congestion" that characterize CHF.
    c. Heart failure usually develops in the ventricles and can occur on one side of the heart or the other, or on both sides simultaneously.
    d. Community paramedics are likely to encounter many patients with CHF.
3. CHF has been described in terms of four stages of increasing severity.
4. Symptoms of heart failure include:
    a. Reduced cardiac output
    b. Shortness of breath with or without exertion
    c. Pulmonary edema
    d. Peripheral edema
    e. Angina
    f. Jugular vein distention
5. Appropriate pharmacologic treatment is selected based on the patient's:
    a. Stage of CHF
    b. Response to the medication
6. Three main groups of medications are considered first-line therapy for CHF:
    a. Diuretics
    b. ACE inhibitors or ARBs
    c. β-blockers
7. These medications:
    a. Reduce the workload of the heart
    b. Lower overall fluid volume
8. AAs, cardiac glycosides (digoxin), and vasodilators can be considered if treatment with the three main categories of medications is not adequate.
9. Cardiac glycosides
    a. The class of medications known as cardiac glycosides is represented by the commonly prescribed medication digoxin that acts on the heart in two primary ways, it is a:
        i. Positive inotrope (leading to increased force of contraction)
        ii. Negative chronotrope (leading to altered impulse conduction) in the heart
    b. Digoxin has a narrow therapeutic range—specifically, a serum level of 0.5 to 0.8 ng/mL.
    c. Because of the significant potential for under- or overtreatment with this agent, digoxin is now considered a secondary treatment for CHF, to be used only if the primary treatment is not adequate.
    d. Because of its negative chronotropic action, digoxin can also be useful in the treatment of:

i. Atrial fibrillation
ii. Atrial tachycardia
iii. Supraventricular tachycardia

e. In patients with CHF who are being treated with this medication, digoxin's negative chronotropic effects can severely:
   i. Decrease heart rate
   ii. Impact cardiac rhythm
f. The patient's pulse should be checked before the administration of each dose, if not more often.
g. Caution should be used in patients who have:
   i. Chronic hypokalemia
   ii. Partial AV block
   iii. Renal failure
h. Hyperkalemia reduces the medication's effectiveness; thus, if used in conjunction with medications that promote potassium retention, digoxin may prove less effective or completely ineffective.
i. Early signs of an adverse effect include:
   i. GI distress (anorexia, nausea/vomiting)
   ii. Fatigue
   iii. Visual disturbances (blurred vision, appearance of halos, yellow-green tinge to the eyes)
j. Treat suspected toxicity with the counteractive medication digoxin immune fab (Digibind), which binds to digoxin in the blood and renders it inert.
k. Key medication interactions with digoxin include:
   i. Diuretics that can cause hypokalemia
   ii. Quinidine (an antidysrhythmic medication)
   iii. Verapamil (a CCB)

D. Managing anticoagulation

1. Anticoagulant therapy is prescribed for patients who are at risk for developing blood clots.
2. When blood clots form in a blood vessel, they may subsequently become dislodged.
3. Depending on the site to which blood clots travel, the result may be:
   a. Stroke
   b. Transient ischemic attack
   c. MI
   d. Deep vein thrombosis
   e. Pulmonary embolism
4. To guard against this, patients may be prescribed anticoagulant therapy if he or she has:

   a. A history of blood clots
   b. Recent surgery followed by an extended period of immobility
   c. Aortic valve replacement
   d. Atrial fibrillation
   e. Thrombophilia
   f. Antiphospholipid syndrome
5. Anticoagulants manipulate the coagulation cascade that exacerbates the initial platelet thrombus and may lead to it breaking free from its original site and traveling throughout the body.
6. Several anticoagulants are available.
   a. Warfarin (Coumadin)
   b. Coumarin
   c. Heparin
7. Whereas anticoagulants may be given intravenously in hospitalized patients, oral anticoagulants are typically prescribed to out-of-hospital patients.
8. Adverse effects of anticoagulants potentially include:
   a. Bleeding complications in older patients
   b. Vitamin K deficiency
   c. Deposition of calcium in the arteries and heart valves
   d. Stenosis
   e. MI

E. Managing cholesterol

1. Lipids, a type of fatty acid, include both cholesterol and triglycerides.
2. Cholesterol is both:
   a. Manufactured by the body
   b. Consumed through the diet
3. When concentrations of low-density lipoprotein (LDL) cholesterol in the body rise to excessive levels (hyperlipidemia), they can cause the deposition of plaque in the arteries.
4. Like a blood clot, this plaque can break away and lodge elsewhere in the body, causing:
   a. Stroke
   b. MI
5. Triglycerides are a type of fat that, when found in excess, also increase the risk of heart disease, especially in women.
6. Cholesterol-lowering medications
   a. Lipid-lowering (antihyperlipidemic) medications are prescribed to lower lipid levels in the blood, including LDL cholesterol and triglycerides.
   b. Agents to lower LDL cholesterol include the statins—a class of medications that includes (among others):

i. Atorvastatin
ii. Fluvastatin
iii. Rosuvastatin
iv. Simvastatin

c. Statins:
   i. Inhibit the HMG-CoA reductase enzyme
   ii. Are highly effective in patients with early-stage cardiovascular disease
d. Adverse events linked to their use include various types of muscle damage, including:
   i. Myopathy
   ii. Rhabdomyolysis
e. To lower LDL cholesterol levels, one prescribes bile acid sequestrants, which include:
   i. Cholestyramine (Questran, Prevalite)
   ii. Colestipol (Colestid, Flavored Colestid)
   iii. Colesevelam (Welchol)
f. These medications bind to cholesterol found in bile, thereby enabling its elimination through stools.
g. Adverse effects of bile acid sequestrants include:
   i. GI disturbance (eg, abdominal pain, nausea, vomiting, diarrhea, flatulence)
   ii. Heartburn
   iii. Gallstones
h. Ezetimibe (Zetia) selectively inhibits the intestinal absorption of cholesterol, thereby preventing the cholesterol from reaching the liver.
i. The liver cells then absorb more cholesterol from the bloodstream, which lowers the overall level of this lipid.
j. Adverse effects of ezetimibe may include:
   i. Diarrhea
   ii. Back pain
   iii. Abdominal pain
   iv. Tiredness
   v. Headache
   vi. Dizziness
   vii. Depression
   viii. Stuffy nose
   ix. Cold symptoms
   x. Joint pain
   xi. Cough

7. Triglyceride-lowering medications
    a. Fibrates are prescribed to lower high triglyceride levels; they are less effective in decreasing LDL cholesterol levels.
    b. Adverse effects of fibrates are:
        i. GI in nature (eg, nausea, stomach upset, diarrhea)
        ii. Liver inflammation (mild; can be reversed)
    c. Long-term use of fibrates can:
        i. Cause gallstones
        ii. Lead to gallbladder surgery
    d. Most notable medication interaction for fibrates: Their tendency to increase the effectiveness of anticoagulants, such as warfarin.
    e. The community paramedic should:
        i. Check for this potential interaction
        ii. Contact the medical director if other findings suggest a medication adjustment is needed owing to excessive bleeding (eg, nosebleeds and easy bruising).
    f. Another agent used to lower triglycerides is niacin; it also:
        i. Lowers LDL cholesterol levels
        ii. Raises high-density lipoprotein (HDL) cholesterol
    g. Adverse effects of niacin may include:
        i. Hyperglycemia liver damage
        ii. Flushing (painful burning and itching sensation on the chest, arms, and face)

VI. Respiratory Medications Overview

A. Respiratory diseases

1. Respiratory diseases may be classified based on which part of the respiratory system they affect.
2. Diseases that affect the bronchi include:
    a. COPD
    b. Asthma
    c. Cystic fibrosis
3. Diseases that affect the alveoli include:
    a. Pneumonia
    b. Tuberculosis
    c. Emphysema
    d. CHF
    e. Lung cancer
    f. Acute respiratory distress syndrome

g. Pneumoconiosis ("black lung disease")

B. Managing chronic obstructive pulmonary disease

1. COPD is characterized by a restrictive element as well as an obstructive element; that is, patients are:
   a. Unable to take in adequate air
   b. Unable to exhale what they take in
2. Put simply, patients with COPD struggle to breathe.
3. Key factors in COPD:
   a. An immunologic component in that there is an exaggerated immune response to the presence of foreign bodies such as particles and pollutants, usually from smoke.
   b. The progressive breakdown of the mechanical processes of breathing due to damage to the bronchioles and alveoli in the lungs.
4. COPD is almost always a result of smoking, although exposure to heavily polluted air and secondhand smoke can contribute to its development.
5. There are two major forms of COPD:
   a. Emphysema
   b. Chronic bronchitis
6. In emphysema:
   a. Alveolar walls are damaged
   b. Alveoli lose their shape and elasticity, providing less surface area for gas exchange and making it more difficult both for the sacs to fill with air and for gas exchange to occur over damaged areas.
   c. Patients with emphysema receive less oxygen and suffer effects of poor oxygenation:
      i. Weakness
      ii. Fatigue
      iii. General debility
   d. In chronic bronchitis, inflammation of the bronchi and mucus-producing glands leads to excessive mucus secretion, which in later stages of COPD can contribute to obstruction.
   e. Like their counterparts with asthma, COPD patients may experience critical exacerbations of their condition, such as bacterial or virus infections
   f. COPD patients:
      i. Are chronically ill
      ii. Are vulnerable
      iii. Experience chronic dyspnea
      iv. Are often oxygen dependent at home
      v. Live with chronic hypoxemia and hypercapnea

vi. Are admitted for acute exacerbations of COPD, for which they receive many of the same medications used in asthma treatment.

g. Inhaled delivery of medication may be less effective; in turn, systemic, injected medications—particularly corticosteroids—are used more often in COPD than in asthma.

h. The medications used to treat COPD typically include:
   i. Short-acting β-agonists (SABAs)
   ii. Anticholinergic agents for bronchodilation

i. In acute exacerbations, the bronchodilators are generally administered using a handheld nebulizer device instead of a metered-dose inhaler (MDI).

j. Patients with COPD often develop lung infections, resulting in pneumonia or bronchitis, that require antibiotics.

k. Upon discharge, patients are usually prescribed:
   i. Long-acting β-agonists (LABAs)
   ii. Inhaled steroids

l. Several medical therapies are used as needed in COPD, such as:
   i. Antibiotics
   ii. Mucoactive medications

7. Antibiotics
   a. Most COPD exacerbations are associated with a microbial infection.
      i. Nearly half of these (40–50%) are bacterial.
      ii. Most of the remainder are viral.
   b. Vaccinations, such as "flu shots," and preventive hygiene, such as hand washing and crowd avoidance, are prophylactic measures that can protect against many of the viruses commonly affecting patients with COPD:
      i. Rhinovirus (40–50%)
      ii. Influenza (10–20%)
      iii. Respiratory syncytial virus (10–20%)
      iv. Coronavirus (10–20%)
      v. Adenovirus (5–10%).
   c. For bacterial infections, however, antibiotic therapy is generally required.
      i. Cefuroxime and ciprofloxacin being the two most commonly selected medications.
      ii. Adverse effects with cefuroxime and ciprofloxacin include nausea, vomiting, diarrhea, abnormal liver function tests, and rash.
   d. The pathogens most frequently associated with exacerbations of COPD are:
      i. Haemophilus influenza
      ii. Streptococcus pneumoniae
      iii. Moraxella catarrhalis
8. Mucus-reduction medications

a. Mucoactive medications reduce the mucus hypersecretion associated with COPD in some patients, particularly those with chronic bronchitis.
b. One commonly used medication, *N*-acetylcysteine (Mucomyst), is available in inhaled or nebulized form.
c. In addition to effects on mucus, this medication modifies the small airways, limiting the restrictive aspect of the disease.
d. Common adverse effects when Mucomyst is taken by mouth include:
    i. Nausea and vomiting
    ii. Redness and itchiness of the skin
    iii. A nonimmune type of anaphylaxis.
e. If this medication is taken by inhalation, common side effects include:
    i. Nausea
    ii. Vomiting
    iii. Fever
    iv. Rhinorrhea
    v. Chest tightness
    vi. Bronchospasm

C. Managing asthma

1. Asthma: an immune system dysfunction that manifests in the respiratory system
    a. An inappropriate and exaggerated immune response that is dysfunctional and that produces symptoms in the airways.
2. As an immune disorder, asthma is classified as a type I hypersensitivity: an excessive response of the immune system to an encounter with a nonpathogenic substance to which it has been sensitized.
    a. Type I hypersensitivities (also known as atopy) are mediated by immunoglobulin E (IgE).
    b. Upon exposure to a specific allergen:
        i. Bound IgE on mast cells and basophils is cross-linked by the allergen
        ii. The respective cells are then signaled to allow calcium ion influx, which is thought to lead to decreased concentration of cyclic adenosine monophosphate (cAMP) in the cell.
        iii. Decreased cAMP allows the release of primary and secondary mediators, including histamine, serotonin, leukotrienes, among others.
        iv. The primary and secondary mediators are the cause of overt respiratory symptoms, including bronchoconstriction, vasodilation, and increased mucus secretion.
        v. These symptoms cause air to become entrapped below the respiratory tract.
        vi. During an asthmatic episode, the lungs will be near their maximum inflated volume, but there is a resistance to exhaled air.

c. Early-response reaction: one that occurs within minutes to hours after exposure to the allergen.
d. Late-response reaction: one that occurs hours after the early phase and are much more pharmacologically complex than the early-response reactions.
    i. Late-response reactions require specialized care in the emergency department.
    ii. Outpatient asthma management—such as that provided by community paramedics—is aimed at prevention and treatment.
e. While most asthma attacks can be traced to exposure to an antigen, it is well known that acute symptom onset can be induced in some patients by:
    i. Exercise
    ii. Cold air
    iii. Emotional distress

3. General approach to asthma treatment
    a. The emphasis for asthma therapy is on treatment of the underlying inflammation on a daily basis.
    b. If a medication can intervene in the body to prevent symptoms, then this is the optimal outcome.
    c. The treatment protocol for asthma is:
        i. To practice allergen avoidance as much as possible
        ii. To use agents that suppress the immune response appropriately
        iii. To carry fast-acting agents to reverse symptoms if and when they occur
    d. Medications can be grouped into two conceptual categories:
        i. Those that prevent the immune response and/or restrict the actions of initial (primary and some secondary) mediators
        ii. Those used after the release of histamine and other early-phase mediators to treat the resulting symptoms
    e. In the past, asthma was considered to be a disease of "attacks"; asthma is now best understood as a chronic disease whose main feature is an ongoing, underlying inflammatory process.
    f. Treatment changed from focusing solely on treating the acute symptoms by reversal of airway obstruction to addressing the underlying inflammation on a daily basis.
    g. The pharmacologic categories used for early-response asthma prevention and treatment include:
        i. β_2-receptor agonists
        ii. Corticosteroids
        iii. Leukotriene synthesis blockers
        iv. Leukotriene receptor blockers
        v. Monoclonal anti-IgE antibody
        vi. Muscarinic cholinergic receptor blockers (anticholinergics)

vii. Agents aimed at stabilizing the membranes of mast cells and basophils.

h. Preventive medications include (orally administered, inhaled, or injected):
   i. Antagonists of primary mediators or primary mediator effects, such as β_2-adrenergic bronchoconstriction
   ii. Rescue medications for times when symptoms progress or for patients whose symptoms are not well controlled

i. Patients should understand that preventive medications are of little value in treating acute asthma episodes.

4. Oral preventive medications
   a. Daily oral medications for asthma include:
      i. Leukotriene receptor blockers (zafirlukast [Accolate] and montelukast (Singulair) tablets for oral administration
      ii. Thromboxane antagonists (zileuton [Zyflo, Zyflo CR])
      iii. Oral corticosteroids
   b. Long-term use of systemic steroids may have many serious adverse effects, including:
      i. Development of insulin resistance
      ii. Frank diabetes
      iii. Complications in patients who already have diabetes
      iv. Osteoporosis
      v. Adrenal insufficiency
      vi. Hyperlipidemia
   c. That is why burst-and taper dosing is used if possible.
5. Inhaled preventive medications
   a. Inhaled medications are used to:
      i. Prevent asthma attacks
      ii. Thin mucus secretions
      iii. Provide bronchodilation
      iv. Act as anti-inflammatories
      v. Stimulate respiration
   b. The preventive inhaled products provide optimal results when used on a consistent basis but are not useful for mitigating acute attacks.
   c. Types of inhalers:
      i. Metered-dose inhaler: Requires proper timing between inspiration and actuation to be effective
      ii. Dry-powder inhaler: Must be correctly loaded and primed
   d. The patient's ability to use the device correctly to self-medicate plays a large role in the success or failure of the treatment.
      i. Use of nebulizers and face masks is important in small children
      ii. Use of a spacer is important in older children

e. Inhaled preventive medications include:
   i. Inhaled corticosteroids
   ii. Inhaled long-acting β-agonists
   iii. Combination inhalers (corticosteroid + LABA)
f. The usefulness of corticosteroids to prevent asthma symptoms stems from their glucocorticoid-receptor agonist action, which has several anti-inflammatory effects.
g. Inhaled corticosteroids are not appropriate for immediate ("rescue") use because their effects may not appear until up to 2 weeks after initiation of the therapy.
h. Because some of the inhaled product may remain in the mouth after administration, patients should rinse after each administration to decrease the likelihood of corticosteroid-induced fungal infections occurring in the mouth (eg, oropharyngeal candidiasis).
i. Patients may also be more susceptible to onset or worsening of existing tuberculosis and fungal, bacterial, viral, or parasitic infections.
j. Inhaled β_2-agonists are important asthma treatments because they are very effective bronchodilators.
   i. β-receptor agonists: long- and short-acting medications that target β-receptors
k. Short-acting:
   i. Act up to 6 hours
   ii. More useful for rescue
l. Long-acting:
   i. Act for more than 12 hours
   ii. More useful for prevention of attacks
m. Both the short- and long-acting β_2-agonists use the same mechanism: they occupy and stimulate β_2-receptors in much the same fashion as epinephrine and norepinephrine do.
   i. β_2-agonists lead to bronchial smooth muscle relaxation.
n. Examples of long-acting β_2-agonists include:
   i. Salmeterol (Serevent)
   ii. Formoterol (Foradil, Perforomist)
o. Examples of short-acting agents include:
   i. Albuterol (ProAir RespiClick, Proventil, Ventolin, AccuNeb)
p. Side effects:
   i. Nervousness
   ii. Tachycardia
   iii. Palpitations
   iv. Difficulty sleeping

q. Combination inhalers provide medications from more than one pharmacologic category.
    i. These inhalers provide a long-acting β_2-agonist and a corticosteroid, enabling the patient to benefit from both medications with a single administration.
    ii. Inhalers are intended for daily use; not as a "rescue" medication
r. Examples of combination inhalers for asthma include:
    i. Combination of fluticasone and salmeterol (Advair)
    ii. Combination of budesonide and formoterol (Symbicort)
s. Side effects (same as for inhaled corticosteroids and inhaled LABAs):
    i. Nausea
    ii. Vomiting
    iii. Sore throat
    iv. Hoarseness
    v. Cough
    vi. Fungal infections of the mouth
    vii. Decreased bone thickness in adults
    viii. Eye cataracts

6. Injected preventive therapies
    a. Injected preventive therapies include:
        i. Monoclonal antibody
        ii. Methylxanthines
    b. Examples of injected monoclonal antibody that is available for prevention of asthma and other type I hypersensitivity reactions include Omalizumab (Xolair).
        i. Inject subcutaneously every 2 to 4 weeks, with the dose based on the patient's serum IgE concentration each time.
        ii. Injections must be repeated every 2 to 4 weeks to maintain an effective serum concentration.
    c. Adverse reactions:
        i. Pain
        ii. Redness
        iii. Swelling
        iv. Bruising
        v. Possibility of an anaphylactic reaction
    d. Methylxanthines used as medications:
        i. Theophylline: (Theo-24, Elixophyllin): has both immediate and prophylactic actions; can be delivered either intravenously or orally
        ii. Aminophylline: Generally not available in the United States

e. Athough the exact mechanism of action of the methylxanthines is not completely understood, some important effects of these medications for asthma treatment include:
    i. Elevation of the cell membranes' cAMP concentration
    ii. Antagonism of adenosine receptors (adenosine induces bronchoconstriction)
f. Adverse effects include:
    i. Hypotension
    ii. Tachycardia
    iii. Headache
    iv. Emesis
    v. Cardiac arrhythmias and convulsions (possible)
g. Serum theophylline concentrations must be closely monitored to avoid toxicity. For this reason, the methylxanthines have largely been replaced by inhaled β_2-agonists.
    i. They remain a viable alternative medication choice for patients whose asthma (or COPD) symptoms are resistant to other medication regimens.

7. Fast-acting "rescue" medications
    a. Fast-acting "rescue" medications include:
        i. Short-acting inhaled β-agonists
        ii. Anticholinergic agents
        iii. Intravenous corticosteroids
        iv. Epinephrine
    b. Rescue medications are used to:
        i. Counter an acute attack
        ii. Prevent exercise- or stress-induced attacks.
    c. Because rapid onset is a primary goal for these medications, all of these medications are administered either by some type of inhaler or by injection to ensure a rapid effect.
    d. Short-acting β_2-agonists act by the same mechanism as the long-acting β_2-agonists, except that the SABAs are designed to have:
        i. Immediate or rapid onset of action
        ii. Short duration of action
    e. Although they are considered "rescue" medications, it is common practice to prescribe SABAs as preventive medications, especially for patients who:
        i. May be susceptible to specific, irregular stimuli such as cold air, exercise, or animal dander
        ii. Do not have severe asthma and can be maintained on nominal β_2-agonism
    f. These medications are supplied via inhaler, usually MDI.

g. The most commonly used agent is albuterol, whose adverse effects may include:
    i. Nervousness
    ii. Anxiety
    iii. Tachycardia
    iv. Muscle tremors
h. Acetylcholine has direct constrictor effects on bronchial smooth muscle.
i. Anticholinergic agents cause bronchodilation, even though not as effectively as β_2-agonists; consequently, these medications are typically used as adjunct agents for asthma.
j. Examples of anticholinergic agents include:
    i. Ipratropium (Atrovent): Supplied as an inhaled medication (via aerosol)
    ii. Tiotropium (Spiriva): Supplied as an inhaled medication (via dry-powder inhaler)
k. Common adverse effects of these medications include:
    i. Headache, dry mouth, hoarseness, cough, stuffy nose, sinus pain, nausea, upset stomach, constipation, back pain, blurred vision, and dizziness
l. Injectable corticosteroids can enhance asthma treatment, but they are usually reserved for emergency situations.
m. Examples of injectable corticosteroids include methylprednisolone (Solu-Medrol) and triamcinolone (Kenalog).
n. Epinephrine (adrenaline): One of the staples in emergency treatment of asthma attacks is epinephrine (adrenaline), which acts on both α- and β-receptors and increases cAMP concentrations in several cell types
o. Injectable epinephrine
    i. Usually reserved for emergency situations, with direct physician oversight
    ii. Patient-administered product: the EpiPen auto-injector, whose use is reserved for acute, severe attacks
    iii. Whether injected subcutaneously or intramuscularly, epinephrine has a rapid onset and a short duration of action.
p. Side effects:
    i. Tachycardia
    ii. Palpitations
    iii. Sweating
    iv. Nausea and vomiting
    v. Dizziness
    vi. Feelings of panic
    vii. Cardiac arrhythmias

VII. Psychotropic Medications Overview

A. Psychiatric disorders

1. Community paramedics may encounter patients with psychiatric disorders.
2. Although they will not be expected to diagnose and treat these disorders, they should be familiar with:
    a. Each patient's plan of care, including:
        i. The person's condition
        ii. The pharmacologic and behavioral treatments for the condition
3. The most commonly used classification of psychiatric disorders is found in the Diagnostic and Statistical Manual of Mental Disorders; the fifth edition is known as *DSM-5*.

B. Antidepressants and antianxiety medications

1. Depression is a psychiatric disorder that presents with:
    a. A depressed mood
    b. Loss of interest in daily activities
    c. Lack of pleasure
    d. Feelings of guilt or low self-worth
    e. Disturbed sleep or appetite
    f. Low energy and poor concentration
    g. Suicidal thoughts (in some patients)
2. Depression can lead to substantial impairments in a person's ability to take care of his or her everyday responsibilities.
3. It is hypothesized that depression is caused by deficiencies in multiple serotonin receptors and in the neurotransmitters:
    a. Monoamine
    b. Norepinephrine
    c. Dopamine (D_2)
4. The focus of pharmacologic treatment is to increase the concentrations/levels of these neurotransmitters.
5. In general, all antidepressants:
    a. Boost the synaptic action of one or more of these neurotransmitters
    b. Block the presynaptic transporters (in most cases) that decrease, or recycle, the neurotransmitter
6. Excessive or severe anxiety is characterized by:
    a. Worry
    b. Fear
    c. Muscle tension
    d. Irritability

   e. Sleep changes
   f. Arousal
   g. Fatigue
   h. Breathing changes
   i. Concentration difficulties
7. Anxiety disorders include:
   a. Generalized anxiety disorder
   b. Panic disorder
   c. Obsessive–compulsive disorder
   d. Phobic disorders
   e. Posttraumatic stress disorder
   f. Acute stress disorder
8. Anxiety triggers:
   a. The endocrine system connected to the hypothalamus to increase the levels of the adrenal hormone cortisol
   b. The autonomic nervous system, which causes the fight-or-flight response
9. Chronic increases in cortisol can lead to:
   a. Coronary disease
   b. Type 2 diabetes
   c. Stroke
10. Depression and anxiety are often comorbid conditions.
   a. Share symptoms in common
   b. Psychopharmacologic treatments are similar
11. The four major types of antidepressant medications are:
   a. Tricyclic antidepressants (TCAs)
   b. Selective serotonin reuptake inhibitors (SSRIs)
   c. Serotonin–norepinephrine reuptake inhibitors (SNRIs)
   d. Monoamine oxidase inhibitors (MAOIs)
12. In general, anxiety responds well to benzodiazepines and/or SSRIs or SNRIs.
13. Psychotherapy should always be considered before initiating antidepressant and antianxiety medications.
14. Whenever antidepressant medications are used with a patient, that person should routinely be evaluated for the emergence of suicidal thoughts, particularly if the patient is a young adult (younger than 25 years) or an adolescent.
15. Monoamine oxidase inhibitors
   a. It is theorized that by blocking monoamine oxidase (MAO), MAOIs increase the extent of norepinephrine, serotonin, and dopamine (D_2) neurotransmission in the brain.
      i. The greater availability of noradrenergic, serotonergic, and dopaminergic neurotransmitters provides a powerful antidepressant effect.

b. MAOIs are indicated for:
    i. Depression
    ii. Treatment-resistant depression
    iii. Treatment-resistant panic disorder
    iv. Treatment-resistant social anxiety disorder
c. The onset of action of MAOIs often is delayed by 2 to 4 weeks, and a dosage increase may be required if the medication is not helpful by 6 to 8 weeks.
d. The goal of treatment is:
    i. Remission of symptoms
    ii. Prevention of relapse
e. Symptoms of depression may recur after the medication is stopped.
f. Side effects: Include symptoms of central nervous system (CNS) stimulation, such as:
    i. Anxiety
    ii. Insomnia
    iii. Agitation
    iv. Elevated mood
g. Other troubling side effects may include reduced sleep, constipation, dry mouth, nausea, diarrhea, weight gain, changes in appetite, orthostatic hypotension, and sexual dysfunction.
h. A life-threatening side effect of the MAOIs can be hypertensive crisis, which may be caused by eating certain foods and beverages that contain tyramine.
i. In addition to the tyramine-related issues, other life-threatening side effects that can occur with MAOI use include:
    i. Seizures
    ii. Liver toxicity

16. Tricyclic antidepressants
    a. TCAs were introduced as first-line antidepressants in the 1950s.
    b. They work by blocking the norepinephrine reuptake pump, thereby boosting the availability of the neurotransmitters serotonin, norepinephrine, histamine, muscarine, acetylcholine, and dopamine in the brain.
    c. TCAs are indicated for:
        i. Depression
        ii. Bipolar disorder
        iii. Neuropathic pain (neuropathy)
        iv. Panic disorder
        v. Obsessive–compulsive disorder
    d. The goals of treatment are:
        i. Remission of depressive symptoms
        ii. Prevention of relapse

e. Symptoms of depression may recur after the medication is stopped.
f. By acting on the same neurotransmitters, TCAs can also have benefits as treatments for anxiety and chronic pain, including fibromyalgia.
g. Side effects:
    i. Orthostatic hypotension (dizzy spell)
    ii. Anticholinergic effects such as dry mouth, constipation, blurred vision, and sedation
    iii. Common side effects: Weight gain, dizziness, sexual dysfunction, and nausea and vomiting, sedation
    iv. Life-threatening side effects: Seizures, arrhythmias, hepatic failure, and extrapyramidal symptoms.
    v. Extrapyramidal symptoms may include acute dystonia, a syndrome of abnormal muscle contraction
    vi. Parkinsonian symptoms
    vii. Masklike facies (immobile expressionless face with staring eyes and slightly open mouth), shaking palsy (involuntary tremulous motion), and trembling palsy

17. SSRIs and SNRIs
    a. SSRIs:
        i. Introduced in the mid-1980s
        ii. First-line antidepressant and antianxiety medications
        iii. They block the serotonin reuptake pump in the synaptic space, thereby increasing the concentration of the neurotransmitter serotonin in the brain.
    b. SNRIs:
        i. Introduced in the mid-1990s
        ii. First-line antidepressant and antianxiety medications
        iii. They block both the serotonin and norepinephrine pumps in the synaptic space, thereby boosting the availability of the neurotransmitters serotonin and norepinephrine in the brain.
    c. SSRIs and SNRIs are indicated for depression and numerous anxiety disorders, including:
        i. Panic disorder
        ii. General anxiety disorder
        iii. Posttraumatic stress disorder
        iv. Obsessive–compulsive disorder
    d. Members of these medication classes are effective in these disorders because increasing serotonin and norepinephrine has been shown to decrease anxiety symptoms in patients
    e. Medication responses can often be delayed by 2 to 4 weeks, and patients may require an increase in dose if the medication is not helpful in 6 to 8 weeks.
    f. The goal of treatment is:

i. Remission of symptoms of depression and anxiety
ii. Prevention of relapse

g. Symptoms of depression and anxiety may recur after the medication is stopped.
h. Use of SSRIs or SNRIs to treat anxiety disorders may require long-term treatment of months to years.
i. Safety:
    i. SSRIs and SNRIs are the safest and best-tolerated antidepressant and antianxiety medications, compared to TCAs and MAOIs.
j. Side effects:
    i. Sexual dysfunction (reduced libido, erectile dysfunction, or ejaculatory difficulties)
    ii. Nausea
    iii. Headaches and nervousness
    iv. Insomnia
    v. Weight gain
k. Life-threatening side effects are rare; patients should routinely be evaluated for suicidal thoughts (especially in children and adolescents).

18. Buspirone
    a. Buspirone (Buspar): Medication used for the treatment of anxiety and treatment-resistant anxiety disorders (antianxiety agent).
    b. Its exact mechanism of action is unknown; however, it binds to serotonin and dopamine D_2 receptors.
    c. It is not related to other antianxiety medications (benzodiazepines or barbiturates) and is approved for the treatment.
    d. Side effects:
        i. Dizziness
        ii. Drowsiness
        iii. Nausea
    e. Buspirone does not appear to cause dependence or withdrawal symptoms.
    f. It is best used as an adjunct agent for other antianxiety medications but can also be effective when used as a solo agent.
19. Benzodiazepines
    a. Benzodiazepines act primarily on the CNS
    b. Often the first-line treatment for anxiety
    c. They enhance the inhibitory effects of gamma-aminobutyric acid (GABA), an amino acid that acts as a neurotransmitter in the CNS.
        i. GABA inhibits nerve transmission in the brain, which produces calming effects.

d. Their rapid onset of action makes benzodiazepines a good choice for short-term relief of anxiety.
e. The goal of treatment:
    i. Complete remission of symptoms
    ii. Prevention of relapse.
f. These agents can be used to augment the antianxiety effects of SSRIs and SNRIs.
g. They are also helpful for:
    i. Alleviating insomnia
    ii. Preventing common seizure disorders
    iii. Preventing alcohol withdrawal
h. The choice of a specific benzodiazepine often is based on the time to onset and the duration of action.
i. Safety:
    i. Overall, benzodiazepines are well tolerated and safe.
    ii. Long-term use: May lead to dependence or tolerance and withdrawal when the dosage is reduced or the medication is discontinued.
    iii. Benzodiazepines also have a potential for abuse if treatment periods exceed 12 weeks.
    iv. Monitor for signs of abuse and inappropriate or illegal use
j. Side effects:
    i. Sedation
    ii. Fatigue
    iii. Dizziness
    iv. Loss of body movement control (ataxia)
    v. Confusion
    vi. Memory loss can occur with long-term use
    vii. Respiratory depression (seen in overdose)

C. Managing bipolar disorder

1. Early diagnosis of bipolar disorder is preferred
2. Diagnosis should include input from family members, who can:
    a. Provide historical insight into progression of disease
    b. Help health care providers differentiate between depression and bipolar symptoms
        i. Patients may not report symptoms of mania; family members are much more likely to report these symptoms.
3. The medications for treatment of bipolar disorder generally are classified in one of two categories:
    a. Mood stabilizers

b. Antipsychotics

4. Mood stabilizers: lithium, valproic acid, and carbamazepine
   a. Often the first-choice medications to treat bipolar disorder.
   b. The goal of treatment is to:
      i. Stabilize the patient's mood
      ii. Eliminate the mood swings, or make them less frequent and less severe
   c. Three medications are indicated to treat the symptoms of bipolar disorder:
      i. Lithium
      ii. Valproic acid
      iii. Carbamazepine
   d. Lithium's exact mechanism of action:
      i. Unknown and complex
      ii. Believed to alter the distribution of calcium, sodium, and magnesium ions as well as to alter the synthesis and release of norepinephrine, serotonin, and dopamine in the brain.
   e. Valproic acid:
      i. Antiseizure agent
      ii. Approved to reduce symptoms during manic and depressive episodes
      iii. Believed to work by altering the brain's sodium channels and the concentration of GABA.
   f. Carbamazepine:
      i. Antiseizure agent
      ii. Approved to reduce symptoms during manic and depressive episodes
      iii. Works by altering the brain's sodium channels to increase the release of glutamate, which is a major mediator of excitatory signals in the CNS and is involved in normal brain functions such as cognition, memory, and learning.
   g. Mood stabilizers:
      i. May be used with or without antipsychotic medications
      ii. Effective in relieving acute mania and depressive episodes and can help with maintaining mood stability
      iii. The onset of action of these medications is fairly rapid, such that effects should be apparent within a few days; however, it may take weeks to months for optimal effects to be seen.
   h. Side effects:
      i. Sedation
      ii. Dizziness
      iii. Tremors
      iv. Nausea
      v. Vomiting

vi. Diarrhea
vii. Unsteadiness
viii. Headache
ix. Weight gain
x. Hematologic changes

i. Monitoring the patient's blood levels for these agents enables the prescribing physician to:
    i. Titrate any necessary dose adjustments
    ii. Determine efficacy
    iii. Check for possibly life-threatening toxicity
j. On the physician's behalf, the community paramedic may be able to help monitor:
    i. Complete blood counts (including electrolytes and platelets)
    ii. Lipids and liver, thyroid, and renal function tests
    iii. Patient's weight, body mass index, and blood pressure
k. Serious side effects of lithium:
    i. Renal impairment
    ii. Arrhythmias
    iii. Hypothyroidism
l. Serious side effects of valproic acid:
    i. Thrombocytopenia
    ii. Pancreatitis
    iii. Liver failure
m. Serious side effects of carbamazepine:
    i. Leukopenia
    ii. Anemia
    iii. Thrombocytopenia

5. Lamotrigine
    a. Anticonvulsant
    b. Recently approved for long-term maintenance treatment of bipolar disorder
    c. Regarded as a first-line agent in adults, but not children, by the American Psychiatric Association (APA).
    d. It acts by altering the sodium levels within the cell.
    e. This medication is most effective at stabilizing patients in the depressive phase of bipolar disorder; not useful for acute manic phase.
    f. Lamotrigine can be paired with other medications to:
        i. Stabilize mood acutely
        ii. Transition the patient into preventive therapy
    g. Key adverse effect:

i. Serious rash (particularly when paired with valproic acid or the anticonvulsant divalproex)
ii. Stevens-Johnson syndrome

h. Skin reactions of this sort are most likely to occur in the first 2 to 8 weeks of treatment but may appear at any time.
i. Because these reactions are more common in children, lamotrigine should not be used in patients younger than 16 years of age.

6. Antipsychotic medications
   a. First-generation and second-generation antipsychotic medications are indicated to:
      i. Treat acute manic episodes
      ii. Stabilize mood beyond the acute episode
      iii. Continue to manage symptoms of acute manic episodes over longer periods (known as the maintenance phase)
   b. These medications are particularly valuable in managing the psychotic symptoms that may occur during acute manic episodes, including:
      i. Delusions
      ii. Hallucinations
      iii. Thought disorders
      iv. Symptoms similar to those seen with schizophrenia
   c. Differences between psychotic symptoms in bipolar disease and schizophrenia:
      i. In schizophrenia: Psychotic symptoms present on a persistent basis and embedded in the patient's belief system; manic symptoms absent
      ii. In bipolar disorder: Psychotic symptoms present only during acute manic episodes and subside when the patient's mood has normalized.

D. Managing attention-deficit/hyperactivity disorder

1. Attention-deficit/hyperactivity disorder (ADHD) (previously referred to simply as attention-deficit disorder [ADD]): Learning disorder characterized by symptoms that include:
   a. Hyperactivity
   b. Lack of attention
   c. Lack of focus and concentration
   d. Distractibility
   e. Difficulty organizing and completing tasks
2. The symptoms must interfere with:
   a. School
   b. Employment
   c. Social functioning
3. Often, ADHD is not diagnosed until the patient is an adult.

4. The prevalence of ADHD has been the subject of debate.
    a. Numerous estimates of prevalence
5. Stimulant medications
    a. Stimulants are the class of medications most commonly used to treat ADHD.
    b. These substances work by blocking reuptake and facilitating release of norepinephrine and dopamine (D_2) in certain areas of the brain.
    c. Stimulant medications are categorized as either:
        i. Amphetamines
        ii. Methylphenidates
    d. Both are considered Schedule II controlled substances; determining the most effective agent in a particular patient is often a matter of trial and error.
    e. Two types of medication release systems are used:
        i. Instant-release (IR) formulations (duration of action: approximately 4 hours)
        ii. Extended-release (ER) or sustained-release (SR) formulations (durations of action: 6 to 12 hours)
    f. Side effects:
        i. Increases in heart rate of 1 to 2 beats per minute on average
        ii. Elevation of blood pressure by as much as 10 mm Hg
        iii. Weight loss and growth retardation (in pediatric patients)
        iv. Appetite suppression
        v. Sleep disturbance
    g. Long-term use of stimulants can result in physical dependence. When discontinuing the stimulant, the patient may experience:
        i. Excessive fatigue
        ii. Depression
        iii. Craving for the stimulant
    h. Slow titration is the best method for discontinuing the medication.
    i. Monitor patients for signs of abuse
6. Nonstimulant medications
    a. A variety of nonstimulant medications are also used to treat ADHD.
    b. They are most often prescribed for patients who:
        i. Cannot tolerate stimulants
        ii. Have a history of stimulant abuse
    c. These agents are less effective than stimulants.
    d. Most fall into one of two classes:
        i. Antidepressant medications (atomoxetine, bupropion, nortriptyline)
        ii. Centrally acting α_2-adrenergic agonists (guanfacine, clonidine)

e. Atomoxetine (Strattera): Nonstimulant medication in the SNRI class that works by increasing the concentrations of the neurotransmitters in the frontal cortex of the brain:
   i. Norepinephrine at the norepinephrine receptors
   ii. Dopamine at the D_2 receptors
f. Atomoxetine has several advantages:
   i. It lacks the addictive potential of stimulants and is not a controlled substance.
   ii. There are no legal repercussions or controls on its distribution.
   iii. This medication is cost-effective to use and does not differ greatly in efficacy from IR stimulants (much lower efficacy than the ER/SR methylphenidates).
   iv. Atomoxetine is generally well tolerated, and adherence to the prescribed regimen is usually good.
g. The α_2-adrenergic agonists guanfacine and clonidine are not approved in IR form for use in ADHD but have a long history of off-label use for this indication.
   i. ER formulations of both medications have been approved for the ADHD indication.
   ii. Response to these agents is not as robust as the response to stimulants or atomoxetine, but they do help with comorbid tics and lack the appetite suppressive effects observed with stimulants.
   iii. They carry a lower risk of abuse and are good candidates for patients with a history of addiction.
   iv. As antihypertensive agents, they can cause orthostatic hypotension and may cause reactive hypertension if withdrawn suddenly.
   v. In combination with methylphenidate, clonidine was associated with sudden death in children.
   vi. Patients should be screened for cardiac anomalies and monitored if placed on this regimen.
h. Bupropion (Wellbutrin): Atypical antidepressant classified as an aminoketone
   i. Not currently considered a first-line agent for ADHD, but may be useful in patients for whom stimulants or atomoxetine are contraindicated or ineffective.
   ii. Mechanism of action is different from other antidepressant medications; it appears to act (weakly) as both a norepinephrine and a dopamine reuptake inhibitor.
   iii. Slow to take effect; with patients showing a response at approximately 4 weeks, which makes it somewhat less attractive than the faster-acting stimulant medications or atomoxetine.
i. Side effects:
   i. Tremors

ii. Tachycardia
iii. Hypertension
iv. Cardiac arrhythmias
v. Insomnia
vi. Agitation
vii. Irritability
viii. Psychosis

j. The medications can also aggravate motor tics and Tourette syndrome.
k. Dose-dependent incidence of seizures is notably higher with bupropion than with most other antidepressant or ADHD therapies.
l. Children may experience temporary slowing of growth when they use the nonstimulant medications for ADHD, particularly atomoxetine.

E. Managing delusional disorders: schizophrenia

1. Treatment may be more effective in the early stages of the disorder.
2. The symptoms of schizophrenia can be divided into three distinct categories:
   a. Positive symptoms:
      i. Distorted thinking
      ii. Paranoia
      iii. Auditory and visual hallucinations
      iv. Delusions
   b. Negative symptoms
      i. Poor insight and judgment
      ii. Lack of self-care
      iii. Emotional and social withdrawal
      iv. Apathy
      v. Agitation
      vi. Blunted affect
      vii. Poverty of speech
   c. Cognitive symptoms
      i. Difficulties with the ability to pay attention and to focus
      ii. Presence of significant learning and memory problems and disordered thinking
3. Some medications address only a subset of these symptoms, whereas others have broader actions in treating schizophrenia.
4. Antipsychotic medications: an overview
   a. Antipsychotic medications were introduced in the 1950s
      i. Revolutionizing the management of psychoses
      ii. Ending an era of institutional care

iii. Enabling the treatment of people with schizophrenia in the community setting

b. These medications are used to treat a broad range of disorders, including:
   i. Schizophrenia
   ii. Psychoses
   iii. Delusional disorders
   iv. Bipolar disorder
   v. Depression

c. They may also be prescribed to treat:
   i. Emesis
   ii. Tourette syndrome
   iii. Huntington disease

d. Antipsychotic medications are classified as either:
   i. First-generation antipsychotics (FGAs), sometimes called typical antipsychotics
   ii. Second-generation antipsychotics (SGAs), also called atypical antipsychotics

e. Antipsychotic medications offer partial or complete relief of symptoms, not a cure.

f. The length of treatment depends on whether the patient is experiencing his or her:
   i. First episode: Treated for at least 1 year
   ii. Subsequent episodes: May require lifelong maintenance

5. First-generation antipsychotics
   a. FGAs were initially developed for controlling the symptoms of nausea and vomiting associated with cancer chemotherapy and gastroenteritis.
      i. Chloropyrazine and perphenazine are still in use today for this purpose.
   b. FGAs work primarily by blocking dopamine-2 (D_2) receptors in the brain. They also block:
      i. Acetylcholine receptors
      ii. Histamine (H_1) receptors
      iii. Norepinephrine receptors (norepinephrine)
   c. FGAs' action reduces:
      i. Positive symptoms, such as auditory and visual hallucinations and delusions
      ii. Agitation and hyperactive behavior
   d. These medications are less effective for treating the negative symptoms of schizophrenia, such as:
      i. Emotional and social withdrawal
      ii. Blunted affect

e. Psychotic symptoms can improve as soon as 1 week after FGA administration has begun and may continue to improve over the succeeding 4 to 6 weeks.
f. FGAs can also be used to treat episodes of acute bipolar mania, but only until control of the symptoms is gained.
    i. After control of symptoms, a mood stabilizer or atypical antipsychotic SGAs should be used.
g. FGAs are also indicated for use with Tourette syndrome, and can be effective for control of:
    i. Motor tics
    ii. Uncontrolled use of obscene language
    iii. Other symptoms related to Tourette syndrome
h. Safety:
    i. FGAs' mechanism of action can lead to numerous side effects, some of them dangerous.
i. Side effects: Extrapyramidal symptoms
    i. Acute dystonia (syndrome of abnormal muscle contractions)
    ii. Parkinsonian symptoms
    iii. Shaking palsy
    iv. Trembling palsy
    v. Akathisia
    vi. Tardive dyskinesia
j. Acute dystonia can have an onset within a few hours of the initial medication administration.
    i. Its features include spasms of the muscles of the tongue, face, neck, throat, and back
    ii. Acute dystonia is an emergency that requires the addition of anticholinergic agents such as benztropine
k. Parkinsonian symptoms can begin 5 to 30 days after medication therapy is started.
    i. Their features include bradykinesia, which presents as slow movement and muscle rigidity
    ii. Masklike facies, tremors, rigidity, shuffling gait, drooling, and stooped posture may be present.
    iii. The use of anticholinergic agents is the treatment of choice
l. Onset of akathisia can occur between 5 and 60 days after FGAs are started.
    i. Its features include restless movement and symptoms of anxiety and agitation.
    ii. Medications used to treat symptoms of akathisia include benzodiazepines, β-blockers, and anticholinergics.
m. Tardive dyskinesia can have an onset of months to years and is related to medication dose and duration of treatment.

i. More likely to be seen with long-term use of typical antipsychotic agents
ii. In many cases, this condition is irreversible.
iii. Symptoms include involuntary movements of the tongue, mouth, and face.
iv. No reliable treatment for tardive dyskinesia, but the use of benzodiazepines and reduction of dosage of the FGAs can be beneficial.

n. Other dangerous adverse effects that can occur with the use of FGAs include:
i. Neuroleptic malignant syndrome
ii. Anticholinergic effects
iii. Orthostatic hypotension
iv. Sedation
v. Cardiac arrhythmias

6. Second-generation antipsychotics
a. SGAs are referred to as "atypicals" because they generally do not cause the same degree of kinesthetic side effects observed with the "typical" (FGA) antipsychotic medications.
b. Most SGAs work by blocking:
i. D_2 receptors
ii. Multiple serotonin receptors
iii. Norepinephrine receptors
iv. Acetylcholine receptors
v. α_1-adrenergic receptors
vi. Histamine receptors (lesser extent)
vii. Muscarinic receptors (lesser extent)
c. Much is understood about how the various neurotransmitters are affected by the SGAs, but little is known about why these changes in brain chemistry help control the symptoms of schizophrenia.
d. The SGAs have been more commonly used than the FGAs since the 1990s.
e. Whereas the FGAs help control:
i. Auditory and visual hallucinations
ii. Delusions of schizophrenia
iii. Emotional and social withdrawal associated with this disorder
f. The SGAs reduce both the positive and negative symptoms.
g. Efficacy of the medication cannot be accurately determined for at least 4 to 6 weeks, and negative symptoms require 16 to 20 weeks to show a beneficial response.
h. SGAs can also be used:
i. To treat acute mania and bipolar depression
ii. For maintenance of bipolar disorder
iii. To treat behavioral disorders and disorders associated with impulse control and agitation

i. Common side effects:
    i. Dizziness
    ii. Sedation
    iii. Hypotension
j. More serious side effects:
    i. Risk of metabolic syndrome: Features of this syndrome include weight gain, which increases the incidence of diabetes and high cholesterol levels
    ii. Increased risk of dangerous arrhythmias
    iii. Elevated prolactin levels
k. Clozapine:
    i. Associated with an increased risk of infection (agranulocytosis)
    ii. Considered a medication of last resort for this reason
    iii. Been shown to reduce suicidality in schizophrenia and may be used with caution
l. Compared to FGAs, SGAs have a significantly lower risk for extrapyramidal symptoms and tardive dyskinesia.

VIII. Central Nervous System Medications Overview

A. Managing seizure disorders

1. A seizure occurs when portions of the brain become overly stimulated, or when multiple cells break down at the same time in an abnormal fashion.
2. If seizures recur or are prolonged over short periods, the potential for additional seizures increases as:
    a. Nerve cell death
    b. Scar tissue formation
    c. New axons accumulate
3. After a nerve cell becomes activated, certain chemicals prevent a second firing of the neuron until the internal charge of the neuron returns to a resting state.
    a. One of the principal inhibiting chemicals in the brain is GABA.
        i. If there is a disruption in the cells that produce GABA or in the receptor sites for GABA, channels may fail to open and moderate the excitability of the nerve cell.
    b. Another chemical that plays a significant role in the pathophysiology of seizure activity is glutamate.
        i. A major excitatory mediator in the brain, glutamate binds to receptors that open channels for sodium, potassium, and calcium into the cell.
        ii. Some genetic forms of seizures involve a predisposition for excessively frequent or prolonged activation of glutamate receptors, which increases the excitability of the brain and the possibility of further seizure activity.

4. Seizure disorder: Broad term used to describe any condition for which seizure may be a symptom (often preferred to the term epilepsy)
5. Type of seizure and symptoms are determined by:
    a. Which part of the brain is involved
    b. How much of the brain is involved
    c. Cause of the seizure
6. Two broad categories of seizures are distinguished:
    a. Generalized seizures (absence, atonic, tonic–clonic, myoclonic)
    b. Partial seizures (simple and complex)
7. Non-epileptic seizures: Essentially a symptom caused by either physiologic or psychological conditions
    a. When the seizure activity has a known cause, it is generally classified as a non-epileptic seizure.
    b. Non-epileptic seizures are generally caused by:
        i. Illness
        ii. Injury
        iii. Some other issue that stimulates irregular brain activity
        iv. Infectious diseases such as Human immunodeficiency virus (HIV)/AIDS, encephalitis, or meningitis
        v. Medication use
        vi. High fever (especially in children)
        vii. Abrupt cessation of certain medications
        viii. Excessive alcohol consumption
        ix. Traumatic brain injury
        x. Stroke
        xi. Cardiovascular disorders
        xii. Organ failure, such as of the liver or kidneys
    c. If a seizure has no identifiable cause, it is considered an epileptic seizure.
8. Epileptic seizures: A symptom of epilepsy, a brain disorder in which clusters of neurons sometimes signal abnormally in the brain
    a. When normal neuronal activity in the brain becomes disturbed, it may cause:
        i. Strange sensations
        ii. Emotions
        iii. Behaviors
        iv. Convulsions
        v. Muscle spasms
        vi. Loss of consciousness
    b. Seizure activity could have many possible causes, including:
        i. Brain damage

ii. Abnormal brain development
iii. Illness

c. A person is not considered to have epilepsy unless he or she has two or more episodes of seizure activity
i. Diagnosis is suspected until confirmed by further testing by electroencephalography and brain scans.

9. Seizure medications are selected based on:
a. Type of seizure
b. Age of the patient
c. Side effects
d. Cost

10. There are three main goals of antiseizure/epileptic medication therapy:
a. To eliminate or reduce the frequency of seizure activity to the maximum degree possible
b. To avoid the adverse effects associated with long-term treatment
c. To assist patients in maintaining or resuming their usual routines, psychosocial activities, and occupational activities so as to maintain as normal a lifestyle as possible

11. Anticonvulsants
a. Most of the currently available medications fail to adequately control seizure activity and produce minimal to severe adverse effects.
b. Anticonvulsants include:
i. Valproic acid
ii. Phenobarbital
iii. Levetiracetam
iv. Phenytoin
v. Benzodiazepines
c. Valproic acid (Valproate, Depakene, Depakote): Carboxylic acid derivative.
i. This medication must be delivered orally.
ii. It is used as an anticonvulsant, a vascular headache suppressant, to treat manic episodes associated with bipolar disorder, as an adjunct in schizophrenia, to treat tardive dyskinesia, to minimize aggression in children with ADHD, and for organic brain syndrome mania.
iii. Common side effects include infection, alopecia, nausea, vomiting, abdominal pain, weakness, drowsiness, flulike symptoms, dizziness, diarrhea, and anorexia.
d. Phenobarbital: A barbiturate or barbituric acid derivative that acts as a nonselective CNS depressant.
i. It is primarily used as a sedative hypnotic but also has application as an anticonvulsant.

ii. In subhypnotic doses, it is used to treat all forms of epilepsy, status epilepticus, febrile seizures in children, sedation, and insomnia.
iii. Common adverse effects of this medication include drowsiness, dizziness, tiredness, headache, loss of appetite, nausea, vomiting, and excitation.

e. Levetiracetam (Keppra): An anticonvulsant that is chemically unrelated to the other antiepileptic medications.
i. This agent is often used as monotherapy in patients who experience partial seizures and as an adjunct to other medications in patients who have partial, primary generalized tonic–clonic, and myoclonic seizures.
ii. Levetiracetam is also prescribed to treat neuropathic pain.
iii. Common adverse effects include drowsiness, weakness, infection, loss of appetite, stuffy nose, and dizziness. In children, common adverse effects include sleepiness, accidental injury, hostility, nervousness, and weakness.

f. Phenytoin (Dilantin): A hydantoin whose chemical structure is closely related to that of barbiturates.
i. It is one of the medications most commonly used to control epileptic seizures in the United States and around the world.
ii. Phenytoin is prescribed to treat various types of convulsions and seizures, including generalized tonic–clonic (grand mal) seizures, complex partial (psychomotor, temporal lobe) seizures, status epilepticus, non-epileptic seizures associated with Reye syndrome or head trauma, and Bell palsy.
iii. Common adverse effects include headache, nausea, vomiting, constipation, dizziness, drowsiness, slurred speech, loss of balance or coordination, sleep problems, nervousness, tremors, and rash

g. The benzodiazepines (clonazepam, chlorazepate, diazepam, lorazepam): Similar in their pharmacologic action but have different potencies, and some benzodiazepines work better in the treatment of certain conditions than do others.
i. As a group, these medications are used as anticonvulsants, muscle relaxants, sedatives, and hypnotics, as well as for neurodegenerative disorders such as multiple sclerosis, amyotrophic lateral sclerosis, and Parkinson disease.
ii. Adverse effects most often associated with benzodiazepine toxicity include drowsiness, confusion, dizziness, blurred vision, weakness, slurred speech, lack of coordination, and difficulty breathing.

12. Anticonvulsant side effects

a. The most common side effects seen with epilepsy medications are:
i. Drowsiness
ii. Irritability
iii. Nausea
iv. Rash
v. Unsteadiness

b. Some medications may produce changes in behavior and emotions, and some patients may experience thoughts of suicide.
c. At high doses or with toxicity, patients can demonstrate sedation, slurring of speech, sleep disturbances, and double vision.
d. Of all the anticonvulsants, the medication that should be monitored most carefully, or that should be considered "high priority," is phenytoin.
    i. At therapeutic doses, this medication can produce numerous side effects, but at toxic levels the side effects are alarming, such as Stevens-Johnson syndrome.
    ii. Despite the risks, the medication has a long history of safe use, making it one of the more popular anticonvulsants prescribed by primary providers and a common "first line of defense" in seizure cases.

B. Managing pain

1. Analgesics comprise medications that provide pain relief.
2. The primary classes of analgesics are:
    a. Narcotics or opioids
    b. NSAIDs
3. Other medications, such as gabapentin, are also sometimes used to relieve primarily neurologic pain, but are not classified as analgesics because pain relief is a useful coincidental effect of their activity.
4. The narcotic class includes medications defined pharmacologically as agonist–antagonists.
    a. Agonist: Chemical that binds to a receptor cell and activates a response; often mimic the action of a naturally occurring substance
    b. Antagonist: Inhibits the action of the agonist
5. The best-known medications with mixed agonist–antagonist activity are the opioids:
    a. Morphine
    b. Naloxone (Narcan)
6. The NSAIDs class includes:
    a. Salicylates
    b. COX-2 inhibitors
7. COX-2 inhibitors:
    a. They are selective in that they directly target COX-2, an enzyme responsible for inflammation and pain
    b. They have a less severe impact on the GI tract than do traditional NSAIDs such as salicylates (aspirin).
    c. Benign GI effects reduce the risk of peptic ulceration associated with the traditional NSAIDs.
        i. Celecoxib is an example of a medication that acts as a COX-2 inhibitor.

d. Analgesics provide symptomatic pain relief but have no effect on the cause of that pain.
e. The NSAIDs, due to their dual activity, may be beneficial in both regards.

8. Acute versus chronic pain
   a. Analgesics work at the level of the nerves, either by:
      i. Blocking the signal from the peripheral nervous system
      ii. Distorting the perception of the CNS
   b. Selecting an appropriate analgesic is achieved with consideration of:
      i. The risks and benefits to the patient
      ii. The type and severity of pain the patient may be suffering
      iii. The risk of adverse effects
   c. The prescribing practitioner will examine whether the type of pain the patient is experiencing would be categorized as:
      i. Acute
      ii. Chronic
   d. Acute pain:
      i. Self-limiting in duration
      ii. Includes postoperative pain or pain due to an injury or infection.
      iii. Patients may be treated with narcotics cautiously and with very careful monitoring.
   e. Severe pain:
      i. Patients should have appropriate levels of analgesics provided, both narcotic and non-narcotic whenever possible
   f. Establish expectations: Make patients aware of what they might reasonably expect can decrease the anxiety and fear associated with pain when it occurs.
   g. Evaluate unexpected or abnormal pain for a cause rather than mask with narcotic analgesics.
   h. Chronic pain:
      i. Pain severe enough to impair function that lasts longer than 3 months—is much more difficult to treat
      ii. Long-term use of medications makes side effects more difficult to manage
      iii. Includes the potential for addiction, respiratory depression, or other side effects
      iv. Risk of death from narcotics addiction in people being treated for long-term pain is high
   i. Be extremely alert in managing patients on long-term narcotics for evidence of abuse such as associated use of other drugs or alcohol.
   j. Make patients and family members aware of the signs and symptoms of narcotic over dosage and the treatment.

k. NSAIDs may cause injury through their effects on various organ systems. The potential sequelae from organ damage include:
    i. Cardiovascular risk
    ii. Acute renal failure
    iii. Gastric ulceration and perforation
    iv. Decreased coagulation due to inhibition of platelet aggregation
l. For this reason, treatment of chronic pain requires a combination of:
    i. Medications
    ii. Lifestyle modifications
    iii. Other treatment modalities

9. Narcotics
    a. Narcotics or opiates (opioids): Comprise a variety of chemicals that owe their name to their derivation from the Asian poppy *Palaver somniferous*, also called the opium poppy.
    b. These medications may be classified as:
        i. Natural
        ii. Semisynthetic
        iii. Synthetic
        iv. Endogenous
    c. Natural opioids (eg, morphine or codeine): Created from opiate alkaloids withdrawn from the resin of the opium poppy.
    d. Semisynthetic opioids (eg, oxycodone and hydromorphone): Produced chemically by altering the natural opioids or morphine esters; examples of these medications
    e. Synthetic opioids (eg, meperidine, fentanyl, and methadone): Derived from non-opioid substances in laboratories, although they have similar mechanisms of action
    f. Endogenous opioids (eg, endorphins): Created naturally by the body
    g. Opioids work by chemically binding to specific proteins called opioid receptors, which are found in the:
        i. Brain
        ii. Spinal cord
        iii. GI tract
    h. This binding action blocks transmission of nerve impulses.
    i. Morphine, as well as other opioids, acts on an endogenous opioidergic system, which:
        i. Establishes the body's pain (nociceptive) threshold
        ii. Controls nociceptive processing
        iii. Participates in modulation of GI, endocrine, and autonomic function
        iv. Plays a possible role in cognition

j. Opiate receptors are also responsible for some autonomic functions within the body, such as:
   i. Fluctuations in body temperature
   ii. Alterations in heart rate and respiratory function
k. Opiate receptors influence the neurotransmitters acetylcholine, dopamine, serotonin, and norepinephrine.
   i. These neurotransmitters cause the sensations of well-being and euphoria that the patients experience with medications such as morphine and hydrocodone
   ii. A shortage or excess of these natural chemicals can drastically alter a person's emotional state.
l. Narcotics:
   i. Dull the sense of pain
   ii. Cause drowsiness or sleep
   iii. Relieve severe pain
   iv. Are used preoperatively to reduce anxiety and induce anesthesia
   v. Suppress cough
   vi. Are used in cases of diarrhea
m. In large doses, these medications will suppress the ability to breathe and cause coma and death.
n. Contraindications
   i. Other medications that depress CNS, such as alcohol, barbiturates, and benzodiazepines
   ii. Liver disease or damage
o. Side effects:
   i. They may include drowsiness, dizziness, confusion, sedation, euphoria, insomnia, seizures, heart palpitations, bradycardia, tachycardia, cardiac arrest, nausea, vomiting, constipation, urinary retention, rash, skin flushing, pruritus, respiratory depression, and apnea.

10. Nonsteroidal anti-inflammatory medications
    a. NSAIDs: Reduce inflammation but are not related by structure or action to steroids (glucocorticoids), which also reduce inflammation.
    b. The NSAID class of medications provides both analgesic and antipyretic effects.
    c. A wide variety of NSAIDs are available under an assortment of brand names, with the most recognizable members of this group being (all available over the counter):
       i. Aspirin
       ii. Ibuprofen
       iii. Naproxen
    d. All NSAIDs have a similar mechanism of action.

e. NSAIDs work by reducing the production of prostaglandins.
f. Prostaglandins are chemicals produced by the body that:
    i. Promote inflammation, pain, and fever
    ii. Protect the lining of the stomach and intestines from damaging effects of acid
    iii. Promote blood clotting by activating blood platelets
g. Because they diminish these effects, NSAIDs can:
    i. Cause ulcers in the stomach and intestines
    ii. Increase the risk of bleeding
h. NSAIDs are used for treating conditions that cause:
    i. Inflammation
    ii. Mild to moderate pain
    iii. Fever
i. Examples of conditions include:
    i. Headaches
    ii. Coughs and colds
    iii. Physical injuries
    iv. Gout
    v. Arthritis
    vi. Menstrual cramps
    vii. Postoperative discomfort
j. These medications (especially aspirin) are also used for their antiplatelet effects.
k. Properties of specific NSAIDs
l. Celecoxib (Celebrex) causes fewer instances of GI bleeding or ulceration than do other NSAIDs.
    i. This agent is used for the treatment of osteoarthritis, rheumatoid arthritis, acute pain, ankylosing spondylitis (an inflammatory disease in which vertebrae in the spine become fused together), and primary dysmenorrhea (menstrual cramps).
m. Ibuprofen: Chemically similar to acetylsalicylic acid (ASA, or aspirin) and functions in a comparable way, minimizing the production of prostaglandins.
    i. In lower doses, it appears to irritate the esophageal and gastric linings less than do the related NSAIDs, aspirin and naproxen.
    ii. Ibuprofen is used for rheumatoid arthritis, osteoarthritis, primary dysmenorrhea, gout, dental pain, musculoskeletal disorders, fever, and migraine.
n. Aspirin is indicated for inhibition of platelet aggregation because it inhibits the action of thromboxane A_2.

i. This agent is useful in the management of arterial thrombus and prevention of adverse cardiovascular events.

o. Naproxen is especially effective as an anti-inflammatory agent and is used for:
   i. Headaches
   ii. Menstrual pain
   iii. Arthritis
   iv. Sprains
   v. Other inflammation-based pain

p. Naproxen appears to be superior to ibuprofen in that:
   i. It better targets muscle-tissue inflammation and is not associated with the antiplatelet effect of aspirin.
   ii. It has a longer dosing interval (every 8 to 12 hours) than other NSAIDs (usually every 4 to 6 hours)

q. Ketorolac (Toradol) is a very potent NSAID that is used for short-term management of moderately severe, acute pain that would potentially be treated with narcotics, such as:
   i. Kidney stone pain
   ii. Postsurgical pain

r. It is more effective than other NSAIDs in reducing pain from both inflammatory and noninflammatory causes.

s. Ketorolac should not be used for more than 5 days due to its adverse effects on the kidneys; it also causes ulcers more frequently than do other NSAIDs.

t. Safety:
   i. NSAIDs are generally considered safe; some people experience unwanted effects that are not the same as effects seen with steroid use
   ii. They are not narcotics, so they do not carry any risk of addiction.

u. Side effects:
   i. GI symptoms: nausea, vomiting, indigestion, dyspepsia (indigestion), stomach ulcers, and GI bleeding
   ii. Effects on cardiovascular system, leading to heart attack and stroke
   iii. Effects on urinary system: Sodium or fluid retention and hypertension, pain or urinary retention

v. Exceptions to cardiovascular side effects: Aspirin
   i. Used to prevent strokes and heart attacks in people who are at high risk
   ii. Inhibits blood clotting for a prolonged period by irreversibly acetylating platelets—something none of the other NSAIDs do.
   iii. Effective for preventing clot-related cardiovascular conditions

w. Naproxen is the only other NSAID that has a low likelihood of precipitating cardiovascular disease

x. Contraindications

i. These agents should be avoided in pregnant women, particularly late in pregnancy
ii. Mixing NSAIDs with other medications should be undertaken with caution
iii. Chronic, long-term therapy or overdose can produce toxic effect

y. Signs of toxicity
i. Tenderness
ii. Jaundice
iii. Elevated liver enzymes
iv. Liver failure
v. Sodium and water retention
vi. Acute renal failure
vii. Tissue death
viii. Tachycardia
ix. Cardiac or respiratory arrest
x. Blood complications (rare): Decreased platelet counts, anemia, and reduced white blood cell count
xi. Stevens-Johnson syndrome (rare)

z. Significant toxicity can occur from interactions between NSAIDs and:
i. Lithium
ii. Oral anticoagulants
iii. Oral hypoglycemic agents
iv. Phenytoin
v. Digoxin
vi. Aminoglycoside antibiotics

IX. Antimicrobial Medications Overview

A. Managing viruses

1. Infections are caused by a wide variety of pathogens, including:
   a. Bacteria
   b. Viruses
   c. Fungi
2. To treat the infection effectively, the type of infectious agent must be identified and targeted with therapy.
3. Viruses:
   a. Consist of DNA or RNA surrounded by a capsid (a protein coat)
   b. They replicate by entering a host cell and replacing that cell's genetic material with their own.

c. The host cell's replication mechanism then provides for proliferation of the virus.
d. Their incorporation into the host cell's own structure makes viruses difficult to target with pharmacologic agents because destroying them could also destroy the host cell.

4. Viral infections cause diseases that range in severity from minor (eg, the common cold, chickenpox) to sometimes deadly (smallpox, acquired immunodeficiency syndrome [AIDS]).

B. Antiviral medications

1. Antiviral medications prevent viruses from reproducing, suppressing their spread long enough to allow the body's immune system to kill them.
2. Antivirals as a class of medications are relatively new, with most being discovered and used since the 1990s.
3. There are a limited number of viruses for which effective antiviral medications are available; they include:
   a. Influenza viruses
   b. Herpesviruses
   c. Cytomegalovirus (CMV)
   d. HIV
   e. Respiratory syncytial virus
   f. Hepatitis viruses
4. Viruses can also be divided into two major types:
   a. Retroviruses
   b. Nonretroviruses
5. Retroviruses include, among other viruses, HIV, which is the key pathogen that most antiretroviral medications were designed to address.
6. Antiviral medications are classified.
7. Antiviral agents have a more restricted spectrum of activity compared to antibacterial agents.
   a. Most inhibit viral replication, but the host's immune system must participate to destroy the virus and effect a cure.
   b. The currently available medications do not target nonreplicating or latent viruses.
   c. Many must be activated by viral or host cell enzymes before they will exert their effects
   d. Viruses often mutate; a mutation of a single viral nucleotide is sufficient to render a medication ineffective.
8. Nonretrovirus antiviral agents
   a. Within the nonretroviruses, there are several subdivisions:
      i. Herpes-type viruses

ii. Influenza-type viruses
iii. Hepatitis-type viruses
iv. Other viruses

b. These types are, in turn, targeted by varying antiviral agents.
c. Herpesviruses, once present in the body, cannot be eradicated by currently available medications and are characterized by:
   i. Periods of latency and reactivation
   ii. Flare-ups, when the patient exhibits symptoms
d. Antiherpes agents include:
   i. Acyclovir
   ii. Valacyclovir
   iii. Famciclovir
e. Such medications may be prescribed either on a short-term basis (to mitigate flare-ups) or on a long-term basis (to suppress the virus).
f. The antiherpes agents are generally safe.
g. Side effects:
   i. Nausea
   ii. Diarrhea
   iii. Rash
   iv. Headache
h. Other adverse effects of these medications (especially acyclovir) include those related to neurotoxicity—lethargy, hallucinations, tremors, delirium, and seizures.
i. Anti-influenza agents include:
   i. Amantadine
   ii. Rimantadine
   iii. Oseltamivir
   iv. Zanamivir
j. Because of the mechanism of action of the two adamantine derivatives, amantadine and rimantadine, influenza-B is not affected by these medications.
k. Oseltimivir and zanamivir work against both influenza-A and -B viruses.
   i. Common side effects: Bronchospasm following inhalation therapy with this medication.
l. The amantadines are generally not preferred due to their inability to easily determine whether a flu strain in a patient is influenza-A or -B
   i. Resistance to these medications has developed in some influenza-A strains.
   ii. Side effects can include an amphetamine-like effect of insomnia, nightmares, dizziness, and jitteriness.

iii. The Centers for Disease Control and Prevention recommends that neuraminidase inhibitors be reserved for those patients with severe influenza infections.

m. Side effects of amantadine and rimantadine:
   i. Nervousness
   ii. Light-headedness
   iii. Nausea

n. Most notable side effect of oseltimivir: Nausea, so administer this agent with food

o. Anti-hepatitis virus agents include:
   i. The nucleoside analogs adefovir, clevudine, and entecavir
   ii. The nucleoside reverse transcriptase inhibitors (NRTIs) non-lamivudine, telbivudine, and tenofovir (for hepatitis B)
   iii. Interferons and ribavirin for hepatitis C

p. Note that some of the agents used to treat hepatitis B are considered antiretroviral medications; hepatitis B virus is one of the areas of overlap between the two classes.

q. The important adverse effects of the nucleoside analogs include:
   i. Headache
   ii. Neurotoxicity (confusion, hallucinations)

r. Interferons: Analogs of human cytokines; their use as medications is a means of boosting the body's natural immune activity against viral cells.
   i. Generally reserved for serious infections that are difficult to manage by other medical means.
   ii. They are usually paired with ribavirin in treatment of hepatitis C virus.

s. Interferon/ribavirin therapy tends to produce a variety of significant adverse effects, the most common of which are:
   i. Significant fatigue
   ii. Flulike symptoms (headache, fever, myalgia)
   iii. Anxiety and/or depression
   iv. Rash
   v. Nausea
   vi. Diarrhea

t. Monitoring for severe adverse effects is an important part of treatment follow-up, as severe symptoms can cause patients to discontinue therapy.

9. Antiretroviral medications
   a. The agents used against retroviruses are all of recent etiology and were identified primarily in response to the emergence of HIV in the late 1970s.
   b. Some of these agents are also used in the treatment of hepatitis C, and a few have been investigated for activity against protozoan infections *Plasmodium*, *Trichomonas*, and *Giardia*.

c. Therapeutic use of these agents for their principal indication, treatment of HIV/AIDS, is a complex, highly specialized topic.
d. The classes of medications that are selected and combined for treatment of any particular patient depend on a great many variables related to:
    i. Host factors
    ii. Natural history of the infection
    iii. Strain of HIV virus involved
    iv. Comorbidities
    v. Other considerations
e. The five classes of antiretroviral agents are
    i. NRTIs
    ii. Non-nucleoside reverse transcriptase inhibitors (NNRTIs)
    iii. Protease inhibitors
    iv. Entry/fusion inhibitors
    v. Integrase strand transfer inhibitors
f. NRTIs: Stop the reproduction of viral genetic matter, thereby inhibiting the spread of the virus to uninfected cells.
    i. Side effects include hypersensitivity responses, lactic acidosis, and peripheral neuropathy.
g. NNRTIs: Stop the reproduction of viral genetic matter, thereby inhibiting the spread of the virus to uninfected cells.
    i. Resistance to these agents has developed quickly.
    ii. When combined with other antiviral and antiretroviral agents, they are still fairly effective against HIV.
    iii. Potential side effects include liver damage, rashes, and sores.
h. Protease inhibitors include a variety of medications; these act by suppressing the viral enzyme protease, which the retrovirus needs to replicate itself.
    i. They are rarely used alone and are more often used in combination with other antiretroviral classes.
    ii. Protease inhibitors are associated with an increased risk of hematuria and bleeding.
    iii. Intracranial hemorrhage has been reported in some patients using tipranavir.
i. Risk factors for bleeding include:
    i. CNS lesions
    ii. Trauma
    iii. Surgery
    iv. Hypertension
    v. Alcohol abuse
    vi. Coagulopathy

vii. Concomitant use of anticoagulant or antiplatelet agents, including vitamin E.

j. All protease inhibitors increase:
   i. Risk of liver dysfunction and hepatitis
   ii. Blood glucose levels

k. Ritonavir has been shown to increase triglycerides, cholesterol, serum glutamic oxaloacetic transaminase (aspartate aminotransferase), serum glutamic pyruvic transaminase (alanine aminotransferase), gamma-glutamyl transferase, creatine phosphokinase, and uric acid levels.

l. Regardless of the specific agent used, baseline values are obtained:
   i. Before initiating therapy
   ii. At intervals or if any clinical signs or symptoms of hypercholesterolemia, uremia, or other imbalances occur during therapy.

Post-Lecture

Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (**date to be determined by instructor**).

B. Read Chapter 22, “Immunizations,” for the next class session.

Chapter 22
Immunizations

Unit Summary

After students complete this chapter and the related course work, they will be able to describe the basic function of the immune system, identify types of vaccines and how they provide immunity, explain how the community paramedic may help implement an immunization schedule, discuss how to conduct an immunization assessment, and describe how to administer vaccinations via various routes. Additionally, they will be able to discuss potential types of reactions to vaccines, the proper storage and handling for vaccines, and the role of the community paramedic when vaccinating in patient- and population-focused settings.

Objectives

1. Describe the basic function of the immune system. (pp 428-430)
2. Identify the types of vaccines and how they provide immunity. (pp 430-431)
3. Explain how the community paramedic may assist in implanting an immunization schedule. (pp 433-440)
4. Identify contraindications and precautions to vaccinations. (pp 440-441)
5. Identify special populations and the considerations to apply during immunization. (pp 441-442)
6. Describe how to conduct an immunization assessment. (pp 442-444)
7. Describe how to communicate the benefits and risks of vaccination. (pp 443-444)
8. Describe how to administer vaccinations via intradermal, subcutaneous, intramuscular, Z-track, and oral routes. (pp 444-450)
9. Describe the potential types of reactions to vaccines and the actions the community paramedic should take. (pp 448-451)
10. Explain the proper storage and handling techniques for vaccines. (pp 451-452)
11. Discuss the role of the community paramedic when vaccinating in patient-focused and population-focused settings. (pp 452-453)

Readings and Preparation

- Review all instructional materials including ***Community Health Paramedicine***, Chapter 22, and all related presentation support materials.
- Review local protocols relating to how the community paramedic may assist in implementing an immunization schedule, contraindications and precautions to vaccination, how to conduct an immunization assessment, the different ways to administer vaccinations, the proper storage and handling techniques for vaccines, and adverse events associated with vaccinations.

Support Materials

- Lecture PowerPoint presentation

Enhancements

- Direct students to visit Navigate 2.
- Provide copies of local protocols.

Unit Activities

Writing assignments: Instruct each student to put together a scenario for immunizations.

Student presentations: Divide students into groups. Instruct each group to act out the immunizations scenario (developed for the writing assignment) for the rest of the class.

Group activities: Discuss and critique each student presentation as a group. Discuss problems regarding community paramedics vaccinating in a patient- and population-focused setting, types of vaccines, contraindications and precautions to vaccination, special populations and the considerations to apply during immunization, and how to communicate the benefits and risks of vaccination.

Pre-Lecture

You are the Community Paramedic

"You are the Community Paramedic" is an opening case study that encourages critical thinking skills.

Instructor Directions

1. Direct students to read the "You are the Community Paramedic" scenario found a the beginning of Chapter 22.

2. You may wish to assign students to a partner or a group. Direct them to review the discussion questions at the end of the scenario and prepare a response to each question.
3. You may also use this as an individual activity and ask students to turn in their comments on a separate piece of paper.

Lecture

I. Introduction

A. Vaccines represent one of the greatest advances of modern medicine.

1. Through the widespread application of vaccines, the threats posed by many once-feared diseases—smallpox, polio, and measles, for example—have been all but eliminated in the United States and many parts of the world.
2. Government programs and guidelines have ensured widespread vaccination of children in the United States.
   a. Children living in poverty remain more likely to not receive the full schedule of vaccines.
   b. Vaccine coverage drops off significantly for adults, as they often fail to get boosters and vaccines for diseases such as seasonal influenza.
3. Community paramedics should seize new opportunities to:
   a. Review each patient's vaccination history
   b. Identify gaps
   c. Vaccinate or schedule vaccinations for people who do not have full coverage
4. This relatively simple step can greatly contribute to improving the health of not just the individual patient, but the overall community.

II. The Immune Response

A. The body's defense

1. The immune system is responsible for providing immunity, the ability to resist damage from foreign substances or harmful chemicals.
2. The human body has multiple defense mechanisms that work together to provide resistance.
3. An infection may be caused by the presence and multiplication of a disease-causing agent (pathogen), which can be a:
   a. Virus
   b. Bacterium
   c. Fungus

d. Protozoan

B. Innate versus adaptive body defenses

1. Body defenses can be divided into two general categories:
   a. Innate (nonspecific)
   b. Adaptive (specific)
2. Innate (nonspecific) defense:
   a. Present at birth
   b. An immune response that is activated each time the body is exposed to a particular challenge
   c. Nonspecific defenses prevent/limit microorganisms and other environmental hazards from entering the body or spreading within it.
3. Adaptive (specific) defense:
   a. An immune response that targets specific pathogens
   b. Carried out by lymphocytes and macrophages that recognize and remember certain foreign substances, known as antigens (or allergens)
4. Before a lymphocyte can respond to an antigen, it must be activated.
5. T lymphocytes (T cells) are activated by the presence of processed antigen fragments attached to the surface of an antigen-presenting cell (accessory cell), which may be:
   a. Macrophages
   b. B lymphocytes (B cells)
   c. Other types of cells
6. Antibodies are round, soluble proteins that make up the gamma globulin part of the plasma proteins.
7. There are five major types of antibodies:
   a. Immunoglobulin G (IgG; found in plasma and tissue fluids)
   b. Immunoglobulin A (IgA; found in exocrine gland secretions, breast milk, tears, nasal fluid, gastric juice, intestinal juice, bile, and urine)
   c. Immunoglobulin M (IgM; the first antibody produced in response to infection)
   d. Immunoglobulin D (IgD; found on the surfaces of most B cells)
   e. Immunoglobulin E (IgE; involved in allergic reactions)
8. Primary immune response: the activation of B cells or T cells after they first encounter the antigens for which they are specialized to react
9. The antibodies are transported to the blood and throughout the body to help destroy antigen-bearing agents.
10. Some of the B cells remain as memory cells so that if the identical antigen is reencountered, clones of these memory cells enlarge and send IgG to the antigen.
11. These memory B cells, along with memory T cells, produce a secondary immune response.

C. Harmful immune responses

1. An immune response that occurs because of a nonharmful substance is called an allergic response.
2. Allergens are a specific type of antigen that triggers allergic responses in sensitive hosts.
3. Another type of reaction involves transplantation and tissue rejection.
   a. When a body part is transplanted from one person to another, the receiving patient's immune system may recognize the transplanted part as foreign and attempt to destroy its tissues, causing a tissue rejection reaction.
4. When the immune system fails to distinguish self from nonself, it may produce autoantibodies as well as cytotoxic T cells that attack and damage the body's tissues and organs.
   a. The "attack against self" is called an autoimmune disorder.

D. Acquired immunity

1. Adaptive (acquired) immunity can be caused by natural events or by administration (oral or injected) of suspensions of killed or weakened pathogens or their molecules.
   a. Active immunity is long-lasting and occurs when a person produces an immune response to an antigen.
   b. Passive immunity occurs when antibodies produced by another person are received by a patient; this type of immunity has only short-term effects.
2. Naturally acquired active immunity occurs when a disease develops from exposure to a pathogen. Resistance then occurs as a result of the primary immune response.
3. A vaccine may consist of killed or weakened (attenuated) bacteria or viruses, pathogenic molecules, or a toxoid (a benign version of a toxin from a pathogenic organism.
4. Vaccines cause artificially acquired active immunity to develop.
5. Herd immunity: generalized resistance to a disease is achieved when large numbers of the population have specific immunity through vaccination to that disease

III. Types of Vaccines

A. Two types of vaccines

1. There are two basic types of vaccines:
   a. Inactivated (dead)
   b. Live attenuated
2. Vaccines can also be made via:
   a. Genetic engineering (recombinant vaccines)

b. A toxoid, in which a toxin from an infectious organism is chemically altered so that it is not dangerous

B. Inactivated vaccines

1. Inactivated vaccines are composed of:
   a. Whole viruses
   b. Bacteria
   c. Fractions of whole viruses or bacteria
2. Organisms in inactivated vaccines are no longer alive. They cannot:
   a. Reproduce
   b. Cause disease by infection even in a person with a compromised immune system
      i. Examples include the polio, hepatitis A, and rabies whole-virus vaccines.
3. Fractional vaccines
   a. Fractional vaccines are developed by purifying the components to be included in the vaccine.
      i. For example, the polysaccharide capsule of a pneumococcal organism
      ii. Examples of polysaccharide vaccines include some pneumococcal, meningococcal, and *Salmonella typhi* vaccines. Other fractional vaccines include those for hepatitis B, influenza, acellular pertussis (whooping cough), human papillomavirus, anthrax, diphtheria, and tetanus.
4. Recombinant vaccines
   a. Recombinant vaccines are inactivated vaccines that are produced by genetic engineering.
      i. Examples of recombinant vaccines include some hepatitis B, human papillomavirus, and *Salmonella typhi* vaccines.

C. Live attenuated vaccines

1. Live attenuated vaccines are derived from disease-causing organisms that are weakened (attenuated) by repeated culturing in a laboratory.
   a. Examples of live attenuated vaccines include those for measles, mumps, rubella, varicella and zoster, yellow fever, rotavirus, influenza (intranasal), and typhus (oral formulation).
   b. These vaccines should not be given to people with suppressed immune systems.

D. Toxoid vaccines

1. Toxoid vaccines are created to combat bacteria that secrete toxins. Toxins can be inactivated or detoxified and used as a vaccine.
2. The vaccine helps the immune system fight off the harmful toxin by producing antibodies.
3. Tetanus is the most common toxoid vaccine and is supplied as a solution or a suspension.

IV. Responses to Vaccines

A. Inactivated and live attenuated vaccines

1. Inactivated vaccines are less likely to draw a response from circulating antibodies than are live vaccines.
    a. Inactivated vaccines may be given when an antibody is already present in the blood, such as:
        i. In infancy (when children still have passive immunity from maternal antibodies they received during gestation)
        ii. Following receipt of antibody-containing blood products.
    b. They are not expected to trigger any sort of systemic reaction.
2. When administering an inactivated vaccine, the entire dose of antigen is administered in an injection, and multiple doses are always required.
3. In contrast to the muted response seen with inactivated vaccines, the immune response to a live attenuated vaccine is virtually identical to that produced by having the disease naturally.
4. Live virus vaccines can be harmful in some people, causing severe or fatal reactions as a result of uncontrolled replication of the vaccine virus. This response occurs only in immunocompromised people.
    a. Examples:
        i. People with leukemia or human immunodeficiency virus (HIV) infection
        ii. People undergoing steroid treatment, chemotherapy, or radiation therapy

V. Choosing the Appropriate Vaccine

A. Administration and making the choice

1. The most widely used vaccines—both live attenuated and inactivated—can be given during the same encounter.
2. Although multiple vaccines may be administered during the same encounter, individual vaccines should not be mixed in the same syringe.
    a. Exception: the DTaP-IPV-Hib (Pentacel) (diphtheria, tetanus, whooping cough [pertussis], polio, and *Haemophilus influenzae* type b [Hib]) combination vaccine
3. Combination vaccines are generally preferred over multiple administrations of single-antigen vaccines.
4. Factors to consider when making this choice include:
    a. The number of injections
    b. The likelihood of patient return for further vaccinations
    c. Vaccine availability
    d. The potential for adverse effects
    e. Patient or parent choice

VI. Immunization Schedules

A. Recommended schedules

1. In the United States, the Advisory Committee for Immunization Practices (ACIP) issues recommended immunization schedules for pediatric patients and adults.
2. Immunization schedules help ensure a steady level of immunity, especially when booster shots are required to maintain immunity, such as with pertussis.
3. Administration of all vaccines for which a person is eligible is important to:
    a. Prevent missed opportunities
    b. Ensure that children are fully immunized at appropriate ages
    c. Increase the general protection afforded to the community by herd immunity

B. Interval between doses of the same vaccine

1. Most childhood vaccines require two or more doses to ensure an adequate and long-lasting antibody response.
2. The vaccine schedule developed by ACIP is based on studies that identified the recommended ages and intervals between doses of the same antigen to develop optimal protection against the disease.
3. Vaccine doses should not be administered at intervals shorter than the recommended intervals or earlier than the minimum ages.
    a. It may be preferable to administer the vaccine sooner than recommended if the patient:
        i. Is unknown to the community paramedic
        ii. Habitually misses appointments
        iii. Has other barriers to care such as lack of transportation

C. Interval between doses of different vaccines

1. If the community paramedic does not administer two live parenteral (injected) vaccines—including the MMR, MMRV, varicella and zoster, and yellow fever vaccines—or the live attenuated influenza vaccine (LAIV) during the same encounter, those vaccinations should be separated by at least 28 days (4 weeks).
2. This interval is intended to reduce or eliminate the interference of the first vaccine with a subsequent vaccine.
3. If two live vaccines are given, but not administered at the same encounter and not separated by 28 days, the second vaccine should be readministered in 4 weeks.

D. Catch-up schedules

1. Doses of vaccines may be administered on an accelerated (catch-up) schedule if:
    a. The child is behind
    b. The child needs to be brought up to date quickly for child care or school entrance
    c. Planned international travel may potentially lead to exposure

VII. Precautions and Contraindications to Vaccination

A. The decision to vaccinate

1. Patients and parents may worry that vaccinations will cause worrisome side effects and should not be given due to the patient's unique circumstance.
2. To allay these risks, at every vaccine assessment, every patient should be screened for:
   a. Precautions (risks to be weighed against the benefits of the vaccine)
   b. Contraindications (factors that rule out use of a vaccine)
3. Some health care providers may hold erroneous beliefs that often result in missed opportunities to vaccinate patients.
4. The decision to vaccinate should be based on the overall status of the person rather than any single symptom or condition.

B. Precautions

1. A precaution is a condition in a patient that might:
   a. Increase the chance or severity of a serious adverse reaction from a vaccine
   b. Diminish the patient's ability to produce antibodies to the vaccine
      i. Example: a patient with passive immunity to measles from a blood transfusion may not respond to an MMR or varicella vaccine
2. The most common precaution is a moderate or severe acute illness.
3. Children presenting with mild acute illness should be vaccinated on schedule, such as:
   a. Colds
   b. Otitis media
   c. Upper respiratory illness
   d. Mild diarrhea
   e. Injuries such as a broken arm
4. Disease exposure or recuperation from an illness does not affect the response to a vaccine, nor does it increase the likelihood of an adverse event.
5. An unstable progressive neurologic condition is a precaution to the use of the DTaP vaccine and the Tdap booster.
6. Any history of Guillain-Barré syndrome is a precaution to administration of tetanus-containing vaccines and influenza vaccines.
7. Precautions may be either temporary or permanent.

C. Contraindications

1. Contraindications, in contrast to precautions, describe those circumstances when vaccines should not be administered because serious harm could occur.
   a. Example: Administering influenza vaccine to person with a true anaphylactic allergy to eggs could cause serious illness or death.

2. Most contraindications are only temporary, and the vaccine can be given at a later time.
3. In contrast, the following outcomes are considered permanent contraindications to vaccination (ie, the next dose should not be administered):
    a. A severe allergic reaction to a prior dose of the vaccine or vaccine component
    b. Encephalopathy within 7 days of a pertussis-containing vaccine, not due to other causes
    c. Severe combined immunodeficiency as a contraindication to rotavirus vaccine

VIII. Special Populations

A. Special considerations

1. Special considerations apply when contemplating vaccination of vulnerable populations, including infants and children with certain medical concerns.
2. Temporary contraindications to administration of live attenuated virus vaccines are pregnancy and immunosuppression, whether caused by drugs or diseases such as HIV infection.
    a. A community paramedic who encounters these situations and has questions should contact the medical director prior to proceeding.
3. People in the households of pregnant women or those who are immunosuppressed should be vaccinated. The desired outcome in such a case is a form of herd immunity.

B. Medically vulnerable infants and children

1. Preterm infants respond well to vaccines and should be started on the routine vaccination schedule based on their chronological age.
2. Breastfed babies should be vaccinated just like any other child, and breastfeeding is not a contraindication to administration of any vaccine to the mother except for smallpox.
3. Infants and children who need a tuberculin skin test (TST) should be vaccinated.
    a. All vaccines, including live virus vaccines, can be given on the same day as the TST, or any time after the completion of the TST.
    b. However, if the child has already received the MMR vaccine, then a wait of at least 4 weeks is needed before a TST can be performed.
4. A new type of tuberculosis blood test, the interferon-gamma-release assay (IGRA), has recently been introduced.
    a. The consensus is to handle this test similar to the TST in terms of timing of vaccinations.

C. Pregnancy

1. Vaccinating a pregnant woman creates some unique concerns due to the potential for infection of the fetus with the pathogenic organism, although this risk is considered only theoretical.

   a. Only smallpox vaccine has actually been shown to cause fetal injury.
2. Because of the theoretical possibility of infection transmission, live vaccines should not be administered to pregnant women, or those who anticipate becoming pregnant in the next month.
3. The woman's pregnancy status should be part of a routine screening for contraindications.
4. Inactivated vaccines cannot replicate, so they cannot cause fetal infection.
5. These vaccines may be administered as indicated, with the exception of the human papillomavirus (HPV) vaccines.
6. Pregnancy increases the risk of complications from influenza; hence vaccination of pregnant women against this infection is advised.
7. Even if she received the vaccine earlier, a pregnant woman should receive a dose of Tdap during each pregnancy.

D. Immunosuppression

1. Immunosuppression renders the affected person highly susceptible to infection with a variety of organisms.
2. Both drugs and diseases can cause immunosuppression.
3. In immunosuppressed people, the usually mild effects of live virus vaccines can be transformed into severe or fatal reactions when the vaccine virus replicates rapidly.
4. Live attenuated viruses should not be administered in immunosuppressed people. In contrast, inactivated vaccines do not replicate and are safe to use in such people, although the response to the vaccine may be muted.

IX. Conducting the Immunization Assessment

A. The clinic setting

1. As a community paramedic, you will be administering vaccinations in a clinic setting. If appointments are made for vaccinations, the receptionist staff should remind parents or the people being vaccinated to bring their immunization record.
2. Within the workflow of the clinic, someone should print an immunization record from the state immunization registry system.
   a. This record should be compared to the patient's record on file in the clinic or the electronic medical record, and any missing vaccinations should be reconciled in the clinic system.
   b. The next step is to compare the child's or adult's current age and vaccine history to the recommended immunization schedule in the United States and determine which vaccines are to be administered at this encounter.

B. Patients with uncertain/unknown immunization status

1. The community paramedic may encounter children with uncertain or unknown vaccination status due to a lack of documentation.

2. When their vaccination status is in doubt, patients should be considered susceptible to disease, and age-appropriate immunizations should be initiated without delay according to the recommended schedule.
3. People vaccinated in other countries, regardless of their status (ie, adopted, refugees, immigrants, exchange students), should be vaccinated according to the recommended schedule in the United States.
4. If any questions exist, the best course of action is to:
    a. Complete antibody titers
    b. Revaccinate the patient

C. Identification of precautions and contraindications

1. To prevent serious adverse reactions to vaccination, complete a thorough screening at each immunization encounter.
2. Often the clinic will provide a paper form to be completed by the parent or person being vaccinated.
3. Once the form is complete, the community paramedic should read through the answers and follow up on any possible contraindications.
4. Questions about potential allergies are best asked in a generic way rather than by inquiring about specific vaccine components.
5. LAIV should be given only to essentially healthy children and adults, ages 2 through 49 years.
6. An injectable form of the vaccine should be used in cases when the patient has a contraindication to LAIV administration, such as:
    a. Asthma
    b. Lung disease
    c. Heart disease
    d. Kidney disease
    e. Metabolic problems such as diabetes
    f. A blood disorder
7. To avoid the pregnancy-related risks associated with vaccination, sexually active women who receive live virus vaccines should use effective contraception for 1 month following receipt of these vaccines.

D. Parents with concerns about vaccinating their child

1. As a community paramedic, you should anticipate that some parents will be "vaccine hesitant."
    a. Questioning the safety of vaccines
    b. Selecting only certain vaccines for administration to their child
    c. Refusing all vaccines
2. Be prepared to address their concerns.
3. Be aware of your resources for referral to a physician or other more advanced provider.
4. The best approach is to remain nonjudgmental and determine what the parents understand about vaccines and what the nature of their concerns is.

5. You should discuss any specific concerns and provide factual information using language that is appropriate for the parent, stressing when appropriate that a decision not to vaccinate leaves the child vulnerable to infectious disease.
    a. Use the Vaccine Information Statement (VIS) from the Centers for Disease Control and Prevention (CDC) as a reference to communicate.
6. Be familiar with the state law where you practice and with the forms parents must complete if they choose to be conscientious objectors.

X. Vaccine Administration

A. General considerations

1. The community paramedic administering vaccines should take precautions to minimize the risk of transmitting disease to and from the patient.
2. Hand hygiene should be performed before and after each patient contact.
3. Hand washing with warm running water and soap is preferable, but an alcohol-based hand sanitizer may be used if a water tap is not readily available.
4. Syringes and needles must be sterile, be disposable, and have a safety device to prevent a needlestick injury. They should be discarded in puncture-proof, biohazard labeled containers.
5. Avoid predrawing vaccine, as doing so increases the possibility of mix-ups and the uncertainty of vaccine stability.
6. Different vaccines should not be mixed in the same syringe unless they are specifically licensed for this practice.
7. Anxiety about injections is common among patients of all ages. Managing the pain associated with a needlestick has the potential to improve the immunization experience.

B. Packaging of vaccines

1. Vaccines may be packaged in a variety of containers. The community paramedic should be familiar with each type and know how to ensure safe use and disposal of that container.
2. Ampules
    a. Ampules are breakable sterile glass containers that are designed to carry a single dose of vaccine.
    b. When you are drawing a vaccine from an ampule, follow these steps:
        i. Check the vaccine to be sure that the expiration date has not passed and that it is the correct drug and concentration.
        ii. Shake the vaccine into the base of the ampule. If some of the drug is stuck in the neck, gently thump or tap the stem.
        iii. Using a 4- by 4-inch (10- by 10-cm) gauze pad, an alcohol prep, or an ampule breaker, grip the neck of the ampule and snap it off where the ampule is scored. If the ampule is not scored and an attempt is made to break it, some sharp edges may be present. Drop the stem in the sharps container.

iv. Insert a filtered needle into the ampule without touching the outer sides of the ampule. Draw the solution into the syringe, and dispose of the ampule in the sharps container.
v. Hold the syringe with the needle pointing up, and gently tap the barrel to loosen air trapped inside and cause it to rise. Press gently on the plunger to dispel any air bubbles.
vi. Recap the needle using the one-handed method. Dispose of the needle in the sharps container, and attach a standard hypodermic needle to the syringe if necessary to administer the vaccine.

3. Vials
   a. Vials are small glass or plastic bottles with a rubber-stopper top; they may contain single or multiple doses of a vaccine.
   b. When you are using a vial of vaccine, you must first determine how much of the drug you will need and how many doses are in the vial.
   c. For a single-dose vial, you may draw up the entire amount in the vial. For multiple-dose vials, you should draw up only the amount needed.
      i. Remember that once you remove the cover from a vial, it is no longer sterile.
      ii. If you need a second dose, clean the top of the vial with alcohol before withdrawing the vaccine.
   d. When you are drawing vaccine from a vial, follow these steps:
      i. Check the vaccine to be sure that the expiration date has not passed and that it is the correct drug and concentration.
      ii. Remove the sterile cover, or clean the top with alcohol if the vial was previously opened.
      iii. Wipe the vial's rubber top with an alcohol prep before touching it with the needle. Determine the amount of vaccine needed, and draw that amount of air into the syringe.
      iv. Invert the vial, and insert the needle through the rubber stopper. Expel the air in the syringe into the vial, and then withdraw the amount of vaccine needed.
      v. Withdraw the needle, and expel any air in the syringe.
      vi. Recap the needle using the one-handed method. Label the syringe if the vaccine is not immediately given to the patient.
4. Prefilled syringes
   a. Two types of prefilled syringes exist: those that are separated into a glass drug cartridge with a syringe, and preassembled plastic prefilled syringes.
   b. These syringes are designed for ease of use.
   c. With many drug cartridge and syringe systems, both pieces of the assembly may contain sharps and should be disposed of properly.
   d. To assemble the two-part prefilled syringe:
      i. Pop the yellow caps off of the syringe and the drug cartridge
      ii. Insert the drug cartridge into the barrel of the syringe
      iii. Screw them together
      iv. Remove the needle cover, and expel air in the manner previously described

v. Follow the steps for the route by which the vaccine is to be given

C. Intradermal vaccine administration

1. Intradermal injections involve administering a small amount of vaccine (typically less than 1 mL) into the dermal layer just beneath the epidermis.
2. The technique involves the use of a 1-mL syringe (eg, a tuberculin syringe) and a 25- to 27-gauge, 3/8- to 1-inch (10- to 25-mm) needle.
3. When selecting a site for an intradermal injection, avoid areas that contain superficial blood vessels to minimize the risk of systemic absorption of the injected drug.
4. Because of their high visibility and relative lack of hair, the most common anatomic locations for intradermal injections are the anterior forearm and upper back.
5. Drugs administered intradermally have a slow rate of absorption; there is minimal to no systemic distribution. The vaccine remains locally collected at the site of the injection.
6. Typically, these injections are given in a physician's office or in the hospital to test a patient for allergies or to perform a purified protein derivative (PPD)—a skin test for tuberculosis.
7. Follow these steps to administer a vaccine via the intradermal route:
    a. To assemble the two-part prefilled syringe:
        i. Take standard precautions.
        ii. Check the vaccine to ensure that it is the correct one, that it is not cloudy or discolored, and that the expiration date has no passed, and determine the appropriate amount to give for the correct dose.
        iii. Advise the patient of potential discomfort while explaining the procedure.
        iv. Assemble and check equipment needed: alcohol preps and a 1-mL syringe with a 25- to 27-gauge, 3/8- or 1-inch (10- to 25-mm) needle. Draw up the correct dose of vaccine.
        v. Cleanse the area for administration using aseptic technique.
        vi. Pull the skin taut with your nondominant hand.
        vii. Insert the needle at a 10° to 15° angle with the bevel up.
        viii. Slowly inject the vaccine while observing for the formation of a wheal, or small bump, which indicates that the vaccine is collecting in the intradermal tissue.
        ix. Remove the needle. Immediately dispose of the needle and syringe in the sharps container.
        x. Document the vaccine given, route, administration time, and response of the patient.

D. Subcutaneous vaccine administration

1. Subcutaneous injections are given into the loose connective tissue between the dermis and the muscle layer.
2. Volumes of a drug administered subcutaneously are usually 1 mL or less.

3. The injection is performed using a 24- to 26-gauge, 1⁄2- to 1-inch (13- to 25-mm) needle.
4. Common sites for subcutaneous injections—in both adults and children include:
   a. Upper arms
   b. Anterior thighs
   c. Abdomen
5. Follow these steps to administer a vaccine via the subcutaneous route:
   a. Take standard precautions.
   b. Check the vaccine to ensure that it is the correct one, that it is not cloudy or discolored, and that the expiration date has not passed, and determine the appropriate amount and concentration for the correct dose.
   c. Advise the patient of potential discomfort while explaining the procedure.
   d. Assemble and check equipment needed: alcohol preps and a 3-mL syringe with a 24- to 26-gauge needle. Draw up the correct dose of vaccine.
   e. Cleanse the area for the administration (usually the upper arm or thigh) using aseptic technique.
   f. Pinch the skin surrounding the area, advise the patient of a stick, and insert the needle at a 45° angle.
   g. Inject the vaccine and remove the needle. Immediately dispose of the needle and syringe in the sharps container.
   h. To disperse the vaccine through the tissue, rub the area in a circular motion with your gloved hand.
   i. Properly store any unused vaccine.
   j. Document the vaccine given, route, administration time, and response of the patient.

E. Intramuscular vaccine administration

1. Intramuscular injections are given by penetrating a needle through the dermis and subcutaneous tissue and into the muscle layer.
2. This technique allows administration of a larger volume of vaccine (up to 5 mL) than does the subcutaneous route.
3. Because there is the potential for damage to nerves due to the depth of the injection, it is important to choose the appropriate site.
4. Common anatomic sites for intramuscular injections for adults and children include the following:
   a. Vastus lateralis muscle—the large muscle on the lateral side of the thigh
   b. Rectus femoris muscle—the large muscle on the anterior side of the thigh
   c. Gluteal area—the buttocks, specifically the upper lateral aspect of either side.
      i. When injecting into the gluteal area, you should use the upper, outer quadrant to avoid the sciatic nerve.

d. Deltoid muscle—the muscle of the upper arm that covers the prominence of the shoulder. The site for injection is approximately 1½ to 2 inches (38 to 51 mm) below the acromion process on the lateral side.

5. Follow these steps to administer a vaccine via the intramuscular route:
   a. Take standard precautions.
   b. Check the vaccine to ensure that it is the correct one, that it is not cloudy or discolored, and that the expiration date has not passed, and determine the appropriate amount and concentration for the correct dose.
   c. Advise the patient of potential discomfort while explaining the procedure.
   d. Assemble and check equipment needed: alcohol preps and a 3- to 5-mL syringe with a 21-gauge, 1- or 2-inch (25- or 51-mm) needle. Draw up the correct dose of vaccine.
   e. Cleanse the area for administration (usually the upper arm or the hip) using aseptic technique.
   f. Stretch the skin over the cleansed area, advise the patient of a stick, and insert the needle at a 90° angle.
   g. Pull back on the plunger to aspirate for blood. The presence of blood in the syringe indicates you may have entered a blood vessel. In such a case, remove the needle and hold pressure over the site. Discard the syringe and needle in the sharps container. Prepare a new syringe and needle, and select another site.
   h. If there is no blood in the syringe, inject the vaccine and remove the needle. Immediately dispose of the needle and syringe in the sharps container.
   i. Store any unused vaccine properly.
   j. Document the vaccine given, route, administration time, and response of the patient.
6. Z-track injections
   a. Z-track is another method for administering intramuscular injections.
   b. Following the steps for intramuscular administration, before step 5, pull the patient's skin and subcutaneous tissue laterally.
   c. Then prep the site. The injection is performed in the same way, inserting the needle at a 90° angle.
   d. Again, pull back on the plunger to check for blood and then inject the vaccine if no blood is present. Once the vaccine has been injected, the needle is removed and the skin and subcutaneous tissue that was being held is released.
   e. By displacing the skin initially and allowing it to come back into place, you allow the skin and subcutaneous tissue to seal in the vaccine, which minimizes leakage.

F. Oral vaccines

1. In the United States, there are only two vaccines that are administered by the oral route:
   a. Vaccines for rotavirus
   b. Oral typhoid

2. Oral vaccines should be administered prior to administering injections.
3. The oral applicator is placed inside the patient's cheek, and the plunger is depressed.

G. Nasal vaccines

1. In the United States, the live attenuated seasonal influenza vaccine may be administered via the nasal route.
2. This route should be used for patients over 2 years and adults younger than 50 years.
3. To administer the vaccine, first place the dose divider clip at the end of the applicator's plunger.
4. The cap is removed from the tip of the applicator, and the tip is placed vertically in the patient's nostril.
5. The plunger is depressed until it reaches the dose divider clip. The applicator is removed from the patient's nostril, placed vertically in the other nostril, and the plunger is depressed.

H. Reactions to vaccination

1. Common reactions
   a. Syncope may occur after immunization, particularly in adolescents and young adults.
   b. Be aware of the signs that precede fainting, such as extreme fear or paleness, and take appropriate measures to prevent injuries if weakness, dizziness, or loss of consciousness occurs.
   c. Whenever possible, patients should be offered the opportunity to sit or lie down following vaccination.
2. Adverse reactions
   a. Adverse reactions to vaccination vary from minor to significant and life threatening.
   b. The reactions fall into three general categories:
      i. Local
      ii. Systemic
      iii. Allergic
   c. An adverse reaction could be a true reaction or a coincidental event, but further investigation is often needed to distinguish between the two.
   d. Local reactions occur with an estimated 80% of vaccine doses, depending on the type of vaccine administered.
   e. These reactions are most common with inactivated vaccines, particularly those such as DTaP that contain an adjuvant.
   f. At the injection site, they typically take the form of:
      i. Pain
      ii. Redness
      iii. Swelling
   g. On rare occasions, an Arthus reaction may occur, characterized by severe pain, swelling, induration, edema, and hemorrhage, and occasionally necrosis

in the limb receiving the injection, and requiring transfer for emergency department evaluation.

h. Systemic reactions are more generalized adverse effects, such as:
   i. Fever
   ii. Malaise
   iii. Muscle aches
   iv. Headache
   v. Loss of appetite

i. Anaphylactic reactions to vaccines can be life threatening.

j. An allergic response may be caused by the:
   i. Antigen itself
   ii. A vaccine component such as fragments of cell culture material, a stabilizer, a preservative
   iii. An antibiotic used to inhibit bacterial growth

k. These reactions are extremely rare, occurring in fewer than 1 in 500,000 doses of vaccine, and their risk can be reduced by screening for contraindications, such as a history of a negative reaction after a previous dose of the same vaccine.

l. A list of the specific contraindications to each vaccine to be administered should be available to the community paramedic.

m. All providers of vaccines should have an emergency protocol and an anaphylactic kit at the ready to handle such a reaction.

I. Documentation

1. Following vaccination, you should document the following data in the patient's record:
   a. Vaccine manufacturer, lot number, and date of administration
   b. Name and title of the vaccine administrator
   c. Site (deltoid, lateral vastus) and route (intramuscular, subcutaneous, intranasal, oral) of administration

XI. Vaccine Storage and Handling

A. Recommended practices

1. By following the recommended practices for storage and handling of vaccines, immunization providers play a key role in ensuring the safety and efficacy of vaccines.
2. To ensure those practices are followed, the agency should develop a written plan for all daily vaccine-related activities:
   a. Ordering and accepting vaccine deliveries
   b. Storing and handling vaccines
   c. Managing inventory
   d. Managing potentially spoiled vaccines
   e. Moving the vaccine to an alternative storage location in the event of mechanical failure of the unit or a power outage

3. The agency should identify a vaccine coordinator and backup. All staff members handling vaccines should be trained on storage and handling procedures.
4. The agency should also post details of proper storage conditions on the door of the refrigerator or freezer in which the vaccines are kept.

B. Temperature control issues

1. Vaccines need to be maintained in specific temperature ranges; if exposed to excessive heat or cold, they may lose their potency.
2. At every step at which the vaccine is handled, the temperature to which the vaccine is exposed must be controlled and verified (called the cold chain of the vaccine).
3. When an agency receives a shipment of vaccines, its personnel should immediately check the integrity of the shipping container and confirm that the product was not exposed to excessive heat or cold during transit.
4. The agency should then store the vaccine in a refrigerator or freezer, based on the manufacturer's instructions.
5. Each day, temperature of the refrigerator and freezer should be measured twice and the values should be recorded in a log book.
6. To ensure that the refrigerators or freezers remain in good working order and do not experience power interruptions:
    a. Do not connect them to ground-flow circuit breakers or breakers activated by a wall switch.
    b. Label circuit breakers and plug-ins with signage.
    c. A backup generator should be made available.
    d. Filling empty space in a freezer or refrigerator with water containers can minimize temperature fluctuations during brief mechanical failures.
    e. Hard-sided coolers should be available to move the vaccine to another storage location if needed.
    f. Placing a flashlight, a copy of the emergency plan, and guidelines for safe transport of the vaccine in the cooler would be helpful if staff need to work in the dark following a power outage.

C. Vaccine expiration and contamination

1. Determine if the vaccine was stored at the correct temperature.
2. Never use a vaccine if:
    a. It should be clear but presents as cloudy.
    b. There is any evidence of tampering.
3. If the vaccine may have been compromised, label it with a "Do not use" tag, and then contact the local or state public health immunization program and the vaccine manufacturer for guidance on appropriate steps to take.
4. Before placing the call, be sure to know:
    a. The out-of-range temperature
    b. The estimated time to which the vaccine was exposed to this condition.

5. Document all steps taken and guidance provided per your agency's policy. This documentation should be stored with the temperature logs and kept on file for 3 years.

XII. The Role of the Community Paramedic in Vaccination

A. Patient-focused setting

1. Hospitals or clinic systems may assign a community paramedic to focus on high-frequency patients in an effort to reduce 30-day readmission rates.
   a. Contact with these patients would take the form of home visits.
   b. Very small coolers are commercially available that can be used to transport vaccines for use in the home setting.
   c. If this avenue is pursued, the community paramedic would be responsible for maintaining the cold chain of a single dose of vaccine.
   d. Community paramedics should bring a portable anaphylactic kit as part of the supplies prepared for the vaccination visit, in the unlikely event that a patient develops an allergic reaction to the vaccine.

B. Population-focused setting

1. Some community paramedics may work in a setting with a population-based focus, in which case their responsibilities may require them to adapt to the specific needs of the community.
   a. Example: The homeless
2. In this setting, collecting a history of personal health risks would be essential when doing an immunization assessment.
3. Community paramedics may also work as vaccine providers in the immunization clinic of a local public health agency under the supervision of a public health physician.
4. This responsibility might include covering routine vaccination clinics (patient-focused setting) or assisting with special vaccination campaigns such as senior influenza vaccination or kindergarten round-up.
5. These clinics may be on-site or off-site programs.
   a. In an off-site clinic geared toward vaccination, maintaining the cold chain is an important aspect of clinic management.
   b. A variety of coolers can be used to store vaccines for this type of clinic: hard-sided coolers, coolers with frozen panels and insulation, and portable electric-powered coolers that can operate as refrigerators or freezers.

C. The mass clinic

1. The community paramedic may be assigned to work in a mass clinic setting in response to a local disease outbreak or a pandemic.
2. Organization of these clinics is based upon the incident command system (ICS); the community paramedic should already be familiar with this operational mode as a paramedic.

3. As part of the mass clinic, a community paramedic could function as a triage aide or a symptom evaluator.
4. A community paramedic working in a public health agency should be part of the annual review of these plans and should have just-in-time training when activating a mass clinic plan.

Post-Lecture

Assignments

A. Review all materials from this lesson and be prepared for a lesson quiz to be administered (**date to be determined by instructor**).

