LUCAS COUNTY
DEPARTMENT OF EMERGENCY SERVICES

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TO: All Lucas County Paramedics

FROM: Brent Parquette, NREMT-P
Lucas County EMS Continuing Education Administrator

RE: **Continuing Education February 2008 – Geriatric Emergencies/ Infectious Diseases**

"The graying of America". . . . . .Based upon population measurements, it is evident, that as a whole, the population of the United States is getting older. With an increase in age comes an increase in medical problems. EMS systems have begun to recognize a need for training to aid in providing quality medical care for older individuals. The emergency health-care provider must have insight into the changes that occur with the aging process and the special problems experienced by older adults. The geriatric patient can pose an assessment and treatment challenge to even the most seasoned EMS professional. It is important for us to provide quality assessment, treatment and transport for our geriatric patients.

In addition to a review on ***Geriatrics***, this month's CE will also contain a review of ***Infectious Diseases***. We must continue, through education, increasing our knowledge of the infectious disease process and prevent and/or limit our exposure to potential harmful agents and organisms.

Attached please find educational material for your review prior to class attendance. A pre-test has also been added to "test" your knowledge. Answers will be provided at each of the CE sessions in the month of February.

I look forward to seeing all of you. If you have any questions or comments please feel free to contact me at 419-213-6508.

Review Questions
Geriatric Emergencies/ Infectious Diseases

1. Which of the following is an example of a body system change that occurs with increased age?
    a. Total body water increases
    b. Homeostatic control efficiency reduction
    c. Metabolic rate drops
    d. Total body fat increases

2. Which of the following best describes changes in the respiratory system of the elderly patient?
    a. Lung elasticity decreases
    b. Vital capacity decreases
    c. Respiratory muscle strength decreases
    d. All of the above

3. Which of the following best describes changes in the cardiovascular system of elderly patients?
    a. Left ventricular hypertrophy
    b. Conduction system degeneration
    c. Decreasing cardiac output
    d. All of the above

4. Which of the following tend to complicate the assessment of the elderly?
    a. The elderly often suffer more than one disease at a time
    b. The primary problem often is different from the chief complaint
    c. The patient's perception of pain may be diminished or absent
    d. All of the above

5. Assessing an elderly female patient who presents with poor peripheral pulses, rales, and dependent edema may be difficult because:
    a. Her presentation is consistent with congestive heart failure
    b. Her signs and symptoms may be caused by the aging process
    c. It is often difficult to distinguish acute from chronic problems
    d. All of the above

6. Your patient who complains that the room is spinning, and is nauseated, pale, and sweating, may be suffering from:
    a. Dementia
    b. Delirium
    c. Alzheimer's
    d. Vertigo

7. Which of the following renders the elderly susceptible to making medication errors?
    a. Forgetfulness
    b. Limited income
    c. Vision impairment
    d. All of the above

Scenario for Question 8
Your patient is an 82-year-old woman who presents with some vague complaints about feeling weak and fatigued. She denies any chest pain. She has a long history of cardiac, respiratory, and diabetic problems. She takes a host of medications for each but cannot remember what she took today. In your exam you notice her swollen ankles, weak peripheral pulses, and auscultate some fine basilar rales. You suspect she is having a cardiac episode and begin appropriate pre-hospital management.

8. Which of the following is true regarding this elderly patient?
    a. Absence of chest pain does not rule out myocardial infarction
    b. Her peripheral edema and rales may be normal findings
    c. The first two hours after onset of symptoms are critical
    d. All of the above

9. Alterations in the central nervous system that contribute to mental dysfunction in the older adults include:
    a. A decrease in the total number of neurons
    b. An increase in brain weight
    c. Overstimulation of the adult brain
    d. Lack of educational opportunities for the older adult

10. An 83-year-old female presents with loss of energy, fatigue, irritability, feelings of hopelessness, and extreme isolation. You suspect this patient may be experiencing:
    a. Stroke
    b. Organic brain syndrome
    c. Depression
    d. Cerebral aneurysm

11. In patients over the age of 80, 50% of injury-related deaths occur from:
    a. Motor vehicle crashes
    b. Falls
    c. Head injuries
    d. Burns

12. Hyperthermia in the geriatric patient may be brought on by certain medications that inhibit heat dissipation such as:
    a. Beta blockers
    b. Aspirin
    c. Furosemide
    d. Prednisone

13. A 79-year-old patient presents with orthopnea, a dry hacking cough, nocturia, and ascites. You suspect the patient is experiencing:
    a. Pulmonary embolus
    b. Acute myocardial infarction
    c. Aneurysm
    d. Left-side heart failure

14. Decreases in renal function, combined with other physiological changes, make the older person more susceptible than young adults to:
    a. Sodium loss
    b. Electrolyte abnormalities
    c. Oliguria
    d. Polyuria

15. The most highly lethal musculoskeletal injury in the geriatric patient is:
    a. Thoracic fracture
    b. Pelvic fracture
    c. Femur fracture
    d. Humoral fracture

16. A physiological change in the aging process that is associated with cerebral atrophy produces extra space within the cranial vault, allowing the veins to stretch and tear more easily. This results in:
    a. Severe hypotension
    b. Severe hypertension
    c. Linear skull fractures
    d. Subdural hematomas

17. Venous stasis, heart failure, and immobilization in the older adult contribute significantly to the development of:
    a. Pulmonary dysphagia
    b. Pulmonary toilet
    c. Pulmonary embolism
    d. Pulmonary aspiration

18. As an individual approaches the age of 65 years:
    a. Lean body mass decreases as much as 25% and fat tissue increases 35%
    b. Lean body mass increases as much as 35% and fat tissue decreases by 25%
    c. There is no change in either lean body mass or fat tissue
    d. Lean body mass and fat tissue both increase proportionately

19. A 72-year-old patient presents with a history of smoking three packs per day for 30 years, diabetes, slurred speech, and numbness in his left arm. You suspect that the patient may be experiencing:
    a. Left lateral acute myocardial infarction (AMI)
    b. Chronic obstructive pulmonary disease (COPD)
    c. Pulmonary embolus
    d. Stroke

20. Changes also occur in the heart's electrical conduction pathways as functional cells are lost in the SA and AV nodes and in the rest of the conduction system. These physiological changes often lead to:
    a. Osteoporosis
    b. Increased cardiac output
    c. Huntington's disease
    d. Bradycardia and heart blocks

21. Older patients develop ischemia and dysrhythmia from significant trauma even if the heart has not been directly affected due to:
    a. Left ventricular hypertrophy
    b. Atherosclerosis
    c. Impaired coronary response to increased oxygen demands
    d. AMI

22. The most common sign that an 85-year-old patient is experiencing an acute myocardial infarction (AMI) is:
    a. Dyspnea
    b. Chest pain
    c. Chest pain radiating into the left arm
    d. Chest pressure "like an elephant sitting on my chest"

23. Talking with a geriatric patient can be enhanced by:
    a. Talking extremely loud and more rapidly
    b. Standing above and behind the patient to use their sense of hearing
    c. Speaking slowly, distinctly, and respectfully
    d. Talking down to the patient because his or her ability to understand words is decreased

24. Evaluating the living conditions and immediate surroundings of the geriatric patient is critical for the paramedic to:
    a. Provide information to the receiving physician in determining the ability for self-care after release from the hospital
    b. Determine if the geriatric patient can refuse transport and treatment
    c. Determine the geriatric patient's ability to pay for the emergency department visit
    d. Determine the social status of the patient

25. Which of the following is a government agency that monitors for infectious diseases?
    a. CDC
    b. NIOSH
    c. NFPA
    d. OSHA

26. A small, unicellular organism that causes infection that is treatable by antibiotics is a:
    a. Bacterium
    b. Virus
    c. Fungus
    d. Parasite

27. Which of the following statements is true regarding infectious agents?
    a. Some bacteria have developed resistance to antibiotics
    b. Secondary infections following antibiotic therapy may be more serious than the original infection
    c. Exotoxins may become deactivated in the presence of heat or light
    d. All of the above

28. A microscopic agent of infection that invades cells and is not treatable by antibiotics is a:
    a. Bacterium
    b. Virus
    c. Fungus
    d. Parasite

29. Examples of blood-borne diseases include all of the following EXCEPT:
    a. Hepatitis A
    b. Hepatitis B
    c. AIDS
    d. Syphilis

30. Which of the following microorganisms is considered virulent?
    a. HBV
    b. HIV
    c. Syphilis
    d. All of the above

31. In order to test a paramedic for immunity to hepatitis B, it is necessary to:
    a. Test for the presence of antigens
    b. Wait for symptoms to occur
    c. Test for the presence of antibodies
    d. None of the above

32. The paramedic should be concerned about infection control procedures:
    a. Before the incident
    b. During the incident
    c. After the incident
    d. All of the above

33. Appropriate universal precautions include:
    a. Never recapping needles
    b. Wearing gloves during all patient contact
    c. Isolating all body fluids
    d. All of the above

34. Which of the following statements is true regarding AIDS?
    a. It is transmitted via most body fluids
    b. Paramedics are included in the high-risk group for contracting this disease
    c. The disease weakens the body's immune system by affecting T-lymphocytes
    d. All of the above

35. The most frequent source of AIDS infection in health care workers is:
    a. Airborne droplets
    b. Accidental needle stick
    c. Endotracheal intubation
    d. Mouth-to-mask ventilation

36. The type of hepatitis transmitted from restaurant workers who fail to wash their hands before handling food is:
    a. A
    b. B
    c. C
    d. E

37. Your patient who presents with general malaise, low-grade fever, headache, and a stiff or sore neck may be suffering from:
    a. Hepatitis A
    b. Meningitis
    c. Tuberculosis
    d. AIDS

38. Meningitis is spread primarily by which of the following methods?
    a. A needle stick
    b. Consumption of contaminated food
    c. Blood transfusion
    d. A sneeze or cough

39. To minimize your personal risk when caring for a patient with a suspected infectious disease, you should consider:
    a. The infectious agent
    b. The host
    c. The environment
    d. All of the above

40. MRSA and VRE are examples of infections caused from bacterium:
    a. True
    b. False

41. Staphylococcus aureus ("staph") are bacteria commonly carried:
    a. Within the intestines
    b. Within the spinal fluid
    c. In the nose
    d. Not carried in the body, but picked up from contaminated hard surface

42. A pandemic flu currently exists within the United States:
    a. True
    b. False

43. Scientists believe a pandemic flue is inevitable. The primary concern is for person-to person transmission of:
    a. A influenza
    b. B influenza
    c. Meningitis
    d. Bordetella- Pertusis

44. Persons with latent TB infection are not infectious and cannot spread TB infections to others.
    a. True
    b. False

45. VRE is usually passed to others by direct contact with stool, urine or blood containing VRE.
    a. True
    b. False

Infectious Diseases – Diseases of Immediate Concern to EMS Providers

Infectious Disease

Illnesses caused by infestation of the body by biological organisms such as bacteria, viruses or fungi.

EMS Provider Concerns:

- Hepatitis
- HIV (AIDS)
- Tuberculosis
- Mumps/Chickenpox/Bordetella-Pertusis
- Meningitis
- MRSA, VRE
- Other concerns
    - Avian (Bird Flu)
    - Pandemic Flu

Hepatitis

Inflammation of the liver produced by viruses, bacteria, fungi/parasites, alcohol consumption, and medications

- Hepatitis types:
    - Hepatitis A
    - Hepatitis B
    - Hepatitis C

Hepatitis A Facts

Description	Hepatitis A is a liver disease caused by the hepatitis A virus. Hepatitis A can affect anyone. In the United States, hepatitis A can occur in situations ranging from isolated cases of disease to widespread epidemics. Good personal hygiene and proper sanitation can help prevent hepatitis A. Vaccines are also available for long-term prevention of hepatitis A virus infection in persons 12 months of age and older. Immune globulin is available for short-term prevention of hepatitis A virus infection in individuals of all ages.	
Signs and Symptoms	Adults will have signs and symptoms more often than children.	
	• Jaundice • Fatigue • Abdominal pain • Loss of appetite	• Nausea • Diarrhea • fever
Cause	• Hepatitis A virus (HAV)	
Long-Term Effects	• There is no chronic (long-term) infection. • Once you have had hepatitis A, you cannot get it again • About 15% of people infected with HAV will have prolonged or relapsing symptoms over a 6-9 month period.	
Transmission	• HAV is found in the stool (feces) of persons with hepatitis A • HAV is usually spread from person to person by putting something in the mouth (even though it might look clean) that has been contaminated with the stool of a person with hepatitis A.	
Persons at Risk for Infection	• Household contacts of infected persons • Sex contacts of infected persons • Persons, especially children, living in areas with increased rates of hepatitis A during the baseline period 1987-1997 • Travelers to countries where hepatitis A is common • Users of injection and non-injection drugs	
Prevention	• Hepatitis A vaccine is the best protection. • Short-term protection against hepatitis A is available from immune globulin. It can be given before and within 2 weeks of coming in contact with HAV. • Always wash your hands with soap and water after using the bathroom, changing a diaper, and before preparing and eating food.	
Vaccine Recommendations	Vaccine is recommended for the following persons from 12 months of age and older: • All children at age 1 year (i.e., 12-23 months) • Travelers to countries where hepatitis A is common • Men who have sex with men • Users of injection and non-injection drugs • Persons with clotting-factor disorders (e.g., hemophilia) • Persons with chronic liver disease • Children living in areas with increased rates of hepatitis A during the baseline period of 1987-1997 • Persons who work with HAV in a laboratory setting	
Trends and Statistics	• Hepatitis A occurs in epidemics both nationwide and in communities. • Before hepatitis A vaccine became available, the number of reported cases reached 35,000 per year. • In the late 1990s, hepatitis A vaccine was more widely used and the number of cases reached historic lows. • One-third of Americans have evidence of past infection (immunity).	

Hepatitis B Facts

Description	Hepatitis B is a serious disease caused by a virus that attacks the liver. The virus, which is called hepatitis B virus (HBV), can cause lifelong infection, cirrhosis (scarring) of the liver, liver cancer, liver failure, and death. Hepatitis B vaccine is available for all age groups to prevent hepatitis B virus infection.	
Signs and Symptoms	About 30% of persons have no signs or symptoms. Signs and symptoms are less common in children than adults.	
	• Jaundice • Fatigue • Abdominal pain	• Loss of appetite • Nausea, vomiting • Joint pain
Cause	• Hepatitis B virus (HBV)	
Transmission	• Occurs when blood from an infected person enters the body of a person who is not infected. • HBV is spread through having sex with an infected person without using a condom (the efficacy of latex condoms in preventing infection with HBV is unknown, but their proper use might reduce transmission), by sharing drugs, needles, or "works" when injecting drugs, through needlesticks or sharps exposures on the job, or from an infected mother to her baby during birth. Persons at risk for HBV infection might also be at risk for infection with Hepatitis C virus (HCV) or HIV.	
Risk Groups	• Persons with multiple sex partners or diagnosis of a sexually transmitted disease • Men who have sex with men • Sex contacts of infected persons • Injection-drug users • Household contacts of chronically infected persons.	• Infants born to infected mothers • Infants/children of immigrants from areas with high rates of HBV infection • Health-care and public safety workers with exposure to blood • Hemodialysis patients
Prevention	• Hepatitis B vaccine is the best protection. • If you are a health-care or public safety worker, get vaccinated against hepatitis B, and always follow routine barrier precautions and safely handle needles and other sharps.	
Vaccine Recommendations	• Hepatitis B vaccine has been available since 1982 • Routine vaccination of 0-18 year olds • Vaccination of risk groups of all ages	
Long-Term Effects without Vaccination	Chronic infection occurs in: • 90% of infants infected at birth • 30% of children infected at age 1-5 years • 6% of persons infected after age 5 years Death from chronic liver disease occurs in: • 15%-25% of chronically infected persons	
Trends and Statistics	• Number of new infections per year has declined from an average of 260,000 in the 1980s to about 60,000 in 2004. • Highest rate of disease occurs in 20-49 year olds • Greatest decline has happened among children and adolescents due to routine hepatitis B vaccination • Estimated 1.25 million chronically infected Americans, of whom 20-30% acquired their infection in childhood.	

Hepatitis C Facts

<table>
<tr><td>Signs and Symptoms</td><td colspan="2">80% of persons have no signs or symptoms</td></tr>
<tr><td></td><td>• Jaundice
• Fatigue
• Dark urine</td><td>• Abdominal pain
• Loss of appetite
• nausea</td></tr>
<tr><td>Cause</td><td colspan="2">• Hepatitis C virus (HCV)</td></tr>
<tr><td>Long-Term Effects</td><td colspan="2">• Chronic infection: 55%-85% of infected persons
• Chronic liver disease: 70% of chronically infected persons
• Death from chronic liver disease: 1%-5% of infected persons may die
• Leading indication for liver transplant</td></tr>
<tr><td>Transmission</td><td colspan="2">• Occurs when blood from an infected person enters the body of a person who is not infected
• HCV is spread through sharing needles or "works" when "shooting" drugs, through needlesticks or sharps exposures on the job, or from an infected mother to her baby during birth.</td></tr>
<tr><td>Recommendations for testing based on risk for HCV infection</td><td colspan="2">Persons at risk for HCV infection might also be at risk for infection with hepatitis B virus (HBV) or HIV Recommendations for testing based upon risk for HCV infection
<table>
<tr><th>Persons</th><th>Risk of Infection</th><th>Testing Recommended?</th></tr>
<tr><td>Injecting drug users</td><td>High</td><td>Yes</td></tr>
<tr><td>Recipients of clotting factors made before 1987</td><td>High</td><td>Yes</td></tr>
<tr><td>Hemodialysis patients</td><td>Intermediate</td><td>Yes</td></tr>
<tr><td>Recipients of blood and/or solid organs before 1992</td><td>Intermediate</td><td>Yes</td></tr>
<tr><td>People with undiagnosed liver problems</td><td>Intermediate</td><td>Yes</td></tr>
<tr><td>Infants born to infected mothers</td><td>Intermediate</td><td>After 12-18 mos. old</td></tr>
<tr><td>Healthcare/public safety workers</td><td>Low</td><td>Only after known exposure</td></tr>
<tr><td>People having sex with multiple partners</td><td>Low</td><td>No</td></tr>
<tr><td>People having sex with an infected steady partner</td><td>Low</td><td>No</td></tr>
</table></td></tr>
<tr><td>Prevention</td><td colspan="2">• There is no vaccine to prevent hepatitis C.
• If you are HCV positive, do not donate blood, organs, or tissue.</td></tr>
<tr><td>Treatment and Medical Management</td><td colspan="2">• HCV positive patients should be evaluated by their doctor for liver disease
• Interferon and ribavirin are two drugs licensed for the treatment of persons with chronic hepatitis C.
• Interferon can be taken alone or in combination with ribavirin, is currently the treatment of choice.
• Combination therapy can get rid of the virus in up to 5 out of 10 persons for genotype 1 and in up to 8 out of 10 persons for genotype 2 and 3.
• Drinking alcohol can make liver disease worse.</td></tr>
<tr><td>Statistics and Trends</td><td colspan="2">• Number of new infections per year has declined from an average of 240,000 in the 1980s to about 26,000 in 2004.
• Transfusion-associated cases occurred prior to blood donor screening; now occurs in less than one per 2 million transfused units of blood.
• Estimated 4.1 million (1.6%) Americans have been infected with HCV, of whom 3.2 million are chronically infected.</td></tr>
</table>

HIV/AIDS

HIV (Human Immunodeficiency Virus) is the virus that causes AIDS. HIV is different from most other viruses because it attacks the immune system. The immune system gives our bodies the ability to fight infections. HIV finds and destroys a type of white blood cell (T cells or DC4 cells) that the immune system must have to fight disease.

AIDS (Acquired Immunodeficiency Syndrome) is the final stage of the HIV infection. It can take years for a person infected with HIV, even without treatment, to reach this stage. Having aids means that the virus has weakened the immune system to the point at which the body has a difficult time fighting infections. When someone has one or more of these infections and a low number of T cells, he or she has AIDS.

How HIV is transmitted

HIV is a fragile virus. It cannot live for very long outside the body. As a result, the virus is not transmitted through day-to-day activities such as shaking hands, hugging, or a casual kiss. You cannot become infected from a toilet seat, drinking fountain, doorknob, dishes, drinking glasses, food, or pets. You also cannot get HIV from mosquitoes.

HIV is primarily found in the blood, semen, or vaginal fluid of an infected person. HIV is transmitted in 3 main ways:

- Having sex (anal, vaginal, or oral) with someone infected with HIV
- Sharing needles and syringes with someone infected with HIV
- Being exposed (fetus or infant) to HIV before or during birth or through breast feeding

HIV Testing

Once HIV enters the body, the body starts to produce antibodies – substances the immune system creates after infection. Most HIV tests look for these antibodies rather than the virus itself. There are many different kinds of HIV tests, including rapid tests.

A Glance at the HIV/AIDS Epidemic

At the end of 2003, an estimated 1,039,000 to 1,185,000 persons in the United States were living with HIV/AIDS. In 2005, 37,331 cases of HIV/AIDS in adults, adolescents, and children were diagnosed in the 33 states with long-term, confidential name-based HIV reporting. CDC has estimated that approximately 40,000 persons in the United States become infected with HIV each year.

During the mid-to-late 1990s, advances in treatment slowed the progression of HIV infection to AIDS and led to dramatic decreases in deaths among persons with AIDS. The number of deaths of persons with AIDS fluctuated from 2001 through 2005, but the number of AIDS cases diagnosed during that same period increased. The reasons for the increase in the number of AIDS diagnoses are unclear but may be due to increased emphasis on testing; the fact that

more people are living with HIV and thus are experiencing the development of AIDS; and technical issues in the statistical process used in estimating the number of AIDS diagnoses.

Healthcare personnel with documented and possible occupationally acquired AIDS/HIV infection, by occupation, as of December 2002:

Occupation	Documented	Possible
Nurse	24	35
Laboratory worker, clinical	16	17
Physician, nonsurgical	6	12
Laboratory technician, nonclinical	3	-
Housekeeper/maintenance worker	2	13
Technician, surgical	2	2
Embalmer/morgue technician	1	2
Health aide/attendant	1	15
Respiratory therapist	1	2
Technician, dialysis	1	3
Dental worker, including dentist	-	16
Emergency medical technician/paramedic	-	12
Physician, surgical	-	6
Other technician/therapist	-	9
Other healthcare occupation	-	5
TOTAL	**57**	**139**

Tuberculosis (TB)

Tuberculosis (TB) is a disease caused by a germ called Mycobacterium tuberculosis that is spread from person to person through the air. TB usually affects the lungs, but it can also affect other parts of the body, such as the brain, the kidneys, or the spine. When a person with infectious TB coughs or sneezes, droplet nuclei containing M. tuberculosis are expelled into the air. If another person inhales air containing these droplet nuclei, he or she may become infected. However, not everyone infected with TB bacteria becomes sick. As a result, two TB-related conditions exist: latent TB infection and active TB disease.

Latent TB Infection

Persons with latent TB infection do not feel sick and do not have any symptoms, but usually have a positive reaction to the tuberculin skin test or QuantiFERON-TB Gold test. They are infected with M. tuberculosis, but do not have active TB disease. ***Persons with latent TB infection are not infectious and cannot spread TB infections to others.***

Overall, about 5%-10% of infected persons will develop active TB disease at some time in their lives. About half of those people who develop active TB will do so within the first two years of infection.

A person with latent TB infection (LTBI)
• Usually has a skin test or blood test result indicating TB infection
• Has a normal chest x-ray and a negative sputum test
• Has TB bacteria in his/her body that are alive, but inactive
• Does not feel sick
• Cannot spread TB bacteria to others
• Needs treatment for latent TB infection to prevent TB disease; however, if exposed and infected by a person with multidrug-resistant TB or extensively drug-resistant TB, preventive treatment may not be an option

Active TB Infection

In some people, TB bacteria overcome the defenses of the immune system and begin to multiply, resulting in the progression from latent TB infection to active TB disease soon after infection, while others develop active TB disease later when their immune system becomes weak. The general symptoms of active TB disease include:

- Unexplained weight loss
- Loss of appetite
- Night sweats
- Fever
- Fatigue
- Chills

The symptoms of TB of the lungs include:

- Coughing for 3 weeks or longer
- Hemoptysis (coughing up blood)
- Chest pain
- Other symptoms depend on the part of the body that is affected

Persons with active TB disease are considered infectious and may spread TB bacteria to others. If it is determined that a person has active TB disease, therapy is given to treat it. TB disease is a serious condition and can lead to death if not treated.

A person with active TB disease
• Usually has a skin test or blood test result indicating TB infection
• May have an abnormal chest x-ray, or positive sputum smear or culture
• Has active TB bacteria in his/her body
• Usually feels sick and may have symptoms such as coughing, fever, and weight loss
• May spread TB bacteria to others
• Needs treatment to treat active TB disease

How is TB Disease Treated?

TB disease can be treated by taking several drugs over a 6 to 12 month period.

Mumps/Chicken Pox/Bordetella-Pertusis

Mumps

An acute viral illness caused by the mumps virus which is characterized by fever, headache, and muscle aches, tiredness, and loss of appetite; followed by swelling of salivary glands. The parotid salivary glands (which are located within your cheek, near your jaw line, below your ears) are most frequently affected.

The mumps virus replicates in the upper respiratory tract and is spread through direct contact with respiratory secretions or saliva. The infectious period or time that an infected person can transmit mumps to a non-infected person is from 3 days before symptoms appear to about 9 days after the symptoms appear. The incubation time, which is the period from when a person is exposed to virus to the onset of any symptoms, can vary from 16 to 18 days.

Currently, there is no specific treatment for mumps. The mumps vaccine, which is contained in the MMR (measles, mumps, and rubella) vaccine, can prevent the disease.

Chicken Pox (Varicella)

A disease caused by infection with the varicella zoster virus, which causes fever and an itchy rash.

A skin rash of blister-like lesions, covering the body but usually more concentrated on the face, scalp, and trunk. Most, if not all, infected individuals have fever, which develops just before or when the rash appears. If exposed, persons who have been vaccinated against the disease may get a milder illness, with less severe rash (sometimes involving only a few red bumps that look similar to insect bites) and mild or no fever.

The varicella zoster virus is spread by coughing and sneezing (highly contagious), by direct contact, and by aerosolization of virus from skin lesions.

Varicella vaccine can prevent the disease. Currently, two doses of vaccine are recommended for children, adolescents, and adults.

Bordetella-Pertusis

This is a highly communicable, vaccine-preventable disease that lasts for many weeks and is typically manifested in children with paroxysmal spasms of severe coughing, whooping, and posttussive vomiting.

In the United States, 5000-7000 cases are reported each year. Incidence of pertusis has increased steadily since the 1980s. Transmission occurs through direct contact with discharges from respiratory mucous membranes of infected persons.

The best way to prevent pertusis is through vaccinations. The childhood vaccine is called DTaP.

Meningococcal Disease (Meningitis)

Meningitis is an infection of the spinal fluid that surrounds the brain and spinal cord. Meningitis is usually caused by a viral or bacterial infection. Knowing whether meningitis is caused by a virus or bacterium is important because the severity of illness and the treatment differ. Viral meningitis is generally less severe and resolves without specific treatment, while bacterial meningitis can be quite severe and may result in brain damage, hearing loss, or learning disability.

Viral ("aseptic") meningitis is serious but rarely fatal in persons with normal immune systems. Usually, the symptoms last 7 to 10 days and the patient recovers completely. Many different viruses can cause meningitis. About 90% of cases of viral meningitis are caused by members of a group of viruses known as enteroviruses, such as coxsackieviruses and echoviruses. These viruses are more common during the summer and fall months. Herpesviruses and the mumps virus can also cause viral meningitis.

For bacterial meningitis, it is also important to know which type of bacteria is causing the meningitis because antibiotics can prevent some types from spreading and infecting other people. Before the 1990s, *Haemophilus influenza* type b (Hib) was the leading cause of bacterial meningitis, but new vaccines being given to all children as part of their immunizations have reduced the occurrence of invasive disease due to *H. influenza*. Today, *Streptococcus pneumonia* and *Neisseria meningitides* are the leading cause of bacterial meningitis.

Signs and Symptoms of Meningitis

High fever, headache, and stiff neck are common symptoms of meningitis in anyone over the age of 2 years. These symptoms can develop over several hours, or they may take 1 to 2 days. Other symptoms may include nausea, vomiting, discomfort looking into bright lights, confusion, and sleepiness. As the disease progresses, patients of any age may have seizures.

Bacterial meningitis can be treated with a number of effective antibiotics. It is important, however, that treatment be started early in the course of the disease. Appropriate antibiotic treatment of most common types of bacterial meningitis should reduce the risk of dying from meningitis to below 15%, although the risk is higher among the elderly.

Some forms of bacterial meningitis are contagious. The bacteria are spread through the exchange of respiratory and throat secretions (i.e., coughing, kissing). Fortunately, none of the bacteria that cause meningitis are as contagious as things like the common cold or the flu, and they are not spread by casual contact or by simply breathing the air where a person with meningitis has been.

There are vaccines against Hib, against some serogroups of *N. meningitides* and many types of *Steptococcus pneumonia*. The vaccines against Hib are very safe and highly effective.

Methicillin-Resistant Staphylococcus Aureus (MRSA)

Staphylococcus aureus, often referred to simply as "staph," are bacteria commonly carried on the skin or in the nose of healthy people. Approximately 25% to 30% of the population is colonized (when bacteria are present, but not causing infection) in the nose with staph bacteria. Sometimes, staph can cause an infection. Staph bacteria are one of the most common causes of skin infections in the United States. Most of these skin infections are minor (such as pimples and boils) and can be treated without antibiotics (also known as antimicrobials or antibacterials). However, staph bacteria also can cause serious infections (such as surgical wound infections, bloodstream infections, and pneumonia).

What is MRSA?

Some staph bacteria are resistant to antibiotics. MRSA is a type of staph that is resistant to antibiotics called beta-lactams. Beta-lactam antibiotics include methicillin and other more common antibiotics such as oxacilllin, penicillin, and amoxicillin. While 25% to 30% of the population is colonized with staph, approximately 1% is colonized with MRSA.

Symptoms of MRSA

People who are colonized with staph or MRSA do not have any symptoms. Staph skin infections often begin with an injury, which allows the bacteria to enter the skin and develop into an infection. Symptoms include:

- Redness, warmth, swelling, tenderness of the skin, and boils or blisters
- Staph infections are sometimes mistaken for spider bites
- Some people may also have fever and chills

How does MRSA Spread?

Staph infections including MRSA are spread by close contact with infected people. Staph can rub off the skin of an infected person onto the skin of another person during skin-to-skin contact. Staph can also come off the infected skin of a person onto a shared object or surface, and get onto the skin of the person who uses the object next.

Who is at Risk for MRSA?

MRSA infections are more common among persons who have the following risk factors:

- ✓ Recurrent skin diseases or open wounds,
- ✓ Long-term illness or long-term dialysis patients,
- ✓ Illicit injecting drug use
- ✓ Been a patient in the hospital or other healthcare facility within the past year,
- ✓ Contact with other persons with MRSA infection,
- ✓ Recent antibiotic use, or
- ✓ Live in crowded settings

MRSA Treatment

Most MRSA infections can be treated successfully with proper wound care and skin care and by using antibiotics active against MRSA. If antibiotics are needed, they can be usually given by mouth. Some MRSA infections can be difficult to treat and can progress to serious and possibly life-threatening infections. Serious MRSA infections may require intravenous antibiotic treatment. People who are colonized but not infected with MRSA do not usually need to be treated.

Vancomycin-Resistant Enterococci (VRE)

Enterococci are bacteria that are normally present in the human intestines and in the female genital tract and are often found in the environment. These bacteria can sometimes cause infections. Vancomycin is an antibiotic that is often used to treat infections caused by enterococci. In some instances, enterococci have become resistant to this drug and thus are called vancomycin-resistant enterococci (VRE). Most VRE infections occur in hospitals.

Who is at risk for VRE?

The following persons are at an increased risk for becoming infected with VRE:

- ✓ Persons who have been previously treated with vancomycin and combinations of other antibiotics such as penicillin and gentamicin.
- ✓ Persons who are hospitalized, particularly when they receive antibiotic treatment for long periods of time.
- ✓ Persons with weakened immune systems such as patients in Intensive Care Units, or in cancer or transplant wards.
- ✓ Persons who have undergone surgical procedures such as abdominal or chest surgery.
- ✓ Persons with medical devices that stay in for some time such as urinary catheters or central intravenous catheters.

VRE was not reported in U.S. hospitals until 1989. Data reported to the Centers for Disease Control and Prevention during 2004 showed that VRE caused about 1 of every 3 infections in hospital intensive care units.

How is VRE spread?

VRE is usually passed to others by direct contact with stool, urine or blood containing VRE. It can also be spread indirectly via the hands of healthcare providers or on contaminated environmental surfaces. VRE usually is not spread through casual contact such as touching or hugging. VRE is not spread through the air by coughing or sneezing.

What is the treatment for VRE?

Most VRE infections can be treated with antibiotics other than vancomycin. The treatment of VRE is determined by laboratory testing to determine which antibiotics are effective.

Avian Influenza (Bird Flu)

Usually, "avian influenza virus" refers to influenza A viruses found chiefly in birds, but infections with these viruses can occur in humans. The risk from avian influenza is generally low to most people, because the viruses do not usually infect humans. However, confirmed cases of human infection from several subtypes of avian influenza have been reported since 1997. Most cases of avian influenza infection in humans have resulted from contact with infected poultry or surfaces contaminated with secretion/excretions from infected birds.

"Human influenza virus" usually refers to those subtypes that spread widely among humans. There are only three known A subtypes of influenza viruses (H1N1, H1N2, and H3N2) currently circulating among humans. It is likely that some genetic parts of current human influenza A viruses came from birds originally. Influenza A viruses are constantly changing, and they might adapt over time to infect and spread among humans.

Symptoms of avian influenza in humans have ranged from typical human influenza-like symptoms (e.g., fever, cough, sore throat, and muscle aches) to eye infections, pneumonia, severe respiratory diseases (such as acute respiratory distress), and other severe and life-threatening complications. The symptoms of avian influenza may depend on which virus caused the infection.

Studies done in laboratories suggest that some of the prescription medicines approved in the United States for human influenza viruses should work in treating avian influenza infections in humans. However, influenza viruses can become resistant to these drugs, so these medications may not always work. Additional studies are needed to demonstrate the effectiveness of these medicines.

Of the few avian influenza viruses that have crossed the species barrier to infect humans, H5N1 has caused the largest number of detected cases of severe disease and death in humans. The H5N1 virus that has caused human illness and death in Asia is resistant to amantadine and rimantadine, two antiviral medications commonly used for influenza. There currently is no commercially available vaccine to protect humans against H5N1 virus that is being seen in Asia and Europe. However, vaccine development efforts are taking place.

Pandemic Influenza (Flu)

A pandemic is a global disease outbreak. An influenza pandemic occurs when an new influenza A virus emerges for which there is little or no immunity in the human population, begins to cause serious illness and then spreads easily person-to-person worldwide.

Historically, the 20th century saw 3 pandemics of influenza:

- 1918 influenza pandemic ("Spanish Flu") caused at least 675,000 U.S. deaths and up to 50 million deaths worldwide
- 1957 influenza pandemic ("Asian Flu") caused at least 70,000 U.S. deaths and 1-2 million deaths worldwide
- 1968 influenza pandemic ("Hong Kong Flu") caused 34,000 deaths and 700,000 deaths worldwide

Characteristics and challenges of a pandemic

1. Rapid Worldwide Spread
    - When a pandemic influenza virus emerges, its global spread is considered inevitable
    - Preparedness activities should assume that the entire world population would be susceptible
    - Countries might, through measures such as border patrol closures and travel restrictions, delay arrival of the virus, but cannot stop it.

2. Health Care Systems Overloaded
    - Most people have little or no immunity to a pandemic virus. Infection and illness rates soar. A substantial percentage of the world's population will require some form of medical care.
    - Nations are unlikely to have the staff, facilities, equipment and hospital beds needed to cope with large numbers of people who suddenly fall ill.
    - Death rates are high, largely determined by four factors: the number of people who become infected, the virulence of the virus, the underlying characteristics and vulnerability of affected populations and the effectiveness of preventive measures.
    - Past pandemics have spread globally in two and sometimes three waves.

3. Medical Supplies Inadequate
    - The need for vaccine is likely to outstrip supply.
    - The need for antiviral drugs is also likely to be inadequate early in a pandemic.

- A pandemic can create a shortage of hospital beds, ventilators and other supplies. Surge capacity at non-traditional sites such as schools may be created to cope with demand
- Difficult decisions will need to be made regarding who gets antiviral drugs and vaccine.

4. Economic and Social Disruption
    - Travel bans, closings of schools and businesses and cancellations of events could have major impact on communities and citizens.
    - Care for sick family members and fear of exposure can result in significant worker absenteeism.

Geriatric Emergencies – February 2008

Aging Statistics

The latter half of the 20th century is often referred to as "the graying of America." As the Baby Boom generation approaches retirement age, the average age of Americans continues to rise. By the year 2000, the number of Americans over the age of 65 increased to 13% of the population (34.8 million). It is estimated that by the year 2030, those 65 and older will account for more than 20% of the overall population. As a result, patients over age 65 will continue to constitute a significant number of EMS transports and calls for service.

Normal Changes with Age

The Aging Body: Respiratory System

- Reduced pulmonary capacity
- Pa02 decreases with age
  - 30 year-old = 90%
  - 70 year-old = 70%
- Loss of cilia, reduced cough reflex
- Smooth airway muscle weakens with age
- Weakening of chest wall
- Alveoli decrease in size and number
- Hypercarbia, Acidosis
- Sluggish chemoreceptors

The Aging Body: Cardiovascular System

- Reduced ability to raise heart rate
- Reduced compliance of ventricles
- Reduced response to catecholamines
- Reduced conduction pathways
  - SA, AV node functional cells
- Reduced vasoconstrictive ability

Between ages 30-80, cardiac output drops by 30%. When this is added to increased PVR an appreciable drop in end organ perfusion occurs.

The Aging Body: Renal, Hepatic, GI Systems

- Renal perfusion falls 50%
- Kidney mass reduced 20% from age 30-80
- GFR is reduced 8mL/min/decade
- Hepatic blood flow reduced
  - Medication levels harder to regulate
- Gastric motility slows

The Aging Body: Nervous System Changes

- By age 80 – brain weight reduced by 20%
- Decreased cerebral blood flow
- Decreased neurotransmitters
- Decreased impulse velocity
- Decreased peripheral NS slows
- Decreased sensation/reflexes (TRAUMA)

The Aging Body: Musculoskeletal Changes

- Muscle shrinkage, calcification
- Osteoporosis, thinning of disks
- Kyphosis
- Decrease in height 2-3 inches
- Balance changes, falls are common

The Aging Body: Miscellaneous Changes

- Reduced vision
  - Degenerative diseases
  - Corrective eyewear
- Reduced hearing
  - Hearing aides

Geriatric Assessment

"Assessment PEARLS"

- Concurrent illnesses are common
- Assessment can be difficult due to chronic conditions
- Response to pain may be diminished
- Patient/pre-hospital care provider may underestimate severity of problem
- Loss of autonomy
  - Fear of going to the hospital
  - Cost of hospitalization - $$$$$
- Patience is a virtue
- Talk to the patient at eye level
- Do not assume the patient is deaf, but speak slowly/carefully
- Be a good listener

Physical Examination

- Layers of clothing may present a problem
- Differentiate chronic from acute
  - Pathological rales, skin elasticity, edema
- "Vials of Life", diabetic syringes, ETOH, hygiene
- What does he/she look like now vs. normal appearance?

Geriatric Chief Complaints

Shortness of Breath

- Associated signs and symptoms?
- History of respiratory complaints
  - COPD vs. CHF
  - Hypertension in combination with shortness of breath is CHF until proven otherwise

Chest Pain

- Often cardiac in nature
- Many experience pain differently
  - Atypical presentations of ACS
- Medication history is important
- Have patient locate pain
- Expose the chest
  - Scars
  - Pacemaker
  - Medication patches
- What are the possibilities (Angina, Aneurysm, PE)

Altered Mental Status

- Some causes manifest quickly, other over days
- Medication reactions are a frequent issue
- Determine LOC and orientation to person, place and time
- Check motor and sensory response
- Get an ECG and blood sugar reading

Abdominal Pain

- More likely for geriatric patient to be hospitalized
- Potential causes change with age
- Overall pain response is decreased
- Patient history is the key
- Look for additional signs
- What are the possibilities (AAA, Diverticulitis, Gallstones, Peptic Ulcer Disease, Intestinal Obstruction)

Dizziness or Weakness

- Factors: Balance, Injury, Oxygen, Energy
- History will help clarify the complaint
- Check ECG, orthostatic changes, Blood sugar
- Check for signs of stroke
- Assess for signs of head trauma

Fever

- Normal response to infection
- Suspect serious infection when accompanied by changed LOC
- Look for immediate life threats
- Fever means illness until proven otherwise

Trauma

- Exam follows the ABCs
- Look for potential medical causes
- Past history may change the needs of the patient
- Find the patient's baseline status
- Fractures are serious injuries

Pain

- Unpleasant sensory or emotional experience
- Use open-ended questions to evaluate
- Pain scale can be helpful
- Interpret vital sign changes as medical issues
- Older patients may hesitate to complain of pain

Falls

- Generally result from contributing factors
- Look for medical reason for fall
- Assess for injury and life threats
- ECG, blood glucose, pulse oximetry

Nausea, Vomiting, and Diarrhea

- Can originate in or out of GI tract
- Check for changes in diet or medications
- Look for signs of dehydration or electrolyte abnormalities
- Assess for GI bleeding

Geriatric Trauma

Trauma is the 5th leading cause of death for persons > 65. A third of traumatic deaths in people 65-74 are secondary to vehicular trauma, and 25% result from falls. In those > 75, falls account for 50% of injury-related deaths.

Vehicular Trauma

- 13 million drivers are > age 65, in 1990
- Difficulties with reaction time, perception, judgment
- Risk of death from multiple trauma is 3 times greater at age 70 than at age 20

Head Trauma

- 2/3 of patients > 65 who are unconscious upon arrival to ED do not survive
- Brain shrinks, creating space between the tissue planes
    - Bleeds w/o symptomology (Subdural hematomas)

Thoracic Trauma

- Any mechanism that suggests thoracic injury in the geriatric patient must be considered lethal
- Loss of chest elasticity, loss of pulmonary reserve, low alveolar surface, loss of small airway patency, response of chemoreceptors
- Geriatric patients have greater risk of heart and major vessel trauma than their younger counterparts

Abdominal Trauma

- 4.7 X death rate
- Less apparent (high degree of suspicion)
- Lower sensitivity to pain
- Poor surgical risks
    - Pulmonary
    - Sepsis

Musculoskeletal Trauma

- Mild impacts cause fx with significant complication
- Pelvic fx can be lethal
- Remember: reduced pain perception with little or no tenderness with major fx

Falls

- 9500 deaths per year
- 1/3 of elderly people living at home fall each year. 1 in 40 hospitalized
- Of older people that are hospitalized as a result of a fall, 50% die within 1 year
- Causes:
  - Prescribed drugs

Geriatric Medical Emergencies

Acute Myocardial Infarction

- Chest pain becomes unreliable as a symptom of MI by age 70
- ECG patterns that mimic or mask "injury" or "ischemia"
  - LBBB
  - LVH
  - Paced Rhythms
- 55% of older patients have chest pain, 13% have vague symptoms. The remaining 32% have "silent" events!
- High index of suspicion

Pulmonary Embolus

- Causes:
  - Immobilization
  - Venous stasis
- Most start in the leg veins and move on
- Signs and symptoms are often misleading
  - LVF
  - Sudden tachypnea
  - Tachycardia
  - Atrial fibrillation
  - Calf discomfort, edema, ankle edema
  - CHF
  - Masquerades as pneumonia

Bacterial Pneumonia

- Incidence and mortality increase with age
- Usual clinical picture
  - Fever
  - Productive cough, pleurisy and consolidation are often absent in the elderly
- Frequently associated with respiratory failure

Cancers

- 1/8 of elderly deaths are as a result of cancer
- Unlike younger cancer patients, the elderly usually have concomitant disease processes and disabilities
- Signs and symptoms
  - Rectal bleeding, malaise, fatigue
  - Many times attributed to other things
- Chemo equals immunosupression equals increased risk of infections (S & S of infections are often masked by the chemo)

Acute Abdominal Pain

- Elderly are capable of suffering severe intra-abdominal problems (appendicitis, perforation) without significant early symptomology
  - Mental deterioration
  - Increased tolerance to pain
  - Inability to localize pain
- Peritonitis is fatal in more than 12% of patients > 60 and more than 30% in patients > 70
- Causes:
  - Appendicitis
  - AAA
  - Diverticular disease
  - Cholecystitis
  - Mesenteric infarctions
- Many elderly patients have advanced sepsis and shock by the time their problems are noticed

Delirium

- Any patients exhibiting these signs and symptoms should be considered a true emergency
- Causes:
  - "ICU psychosis"
  - Trauma, infections
  - Prescription drugs
  - Organic causes:
    - Prescriptions
    - ETOH
    - Toxins
    - Electrolytes, hyper/hypoglycemia, hypoxia, acid-base
    - Wernicke's
    - Tumors, aneurysm, CVA, thyroid problems
    - CHF, MI, Dysrhythmias

Dementia

- Chronic global impairment
  - > 1 year
  - Chronic state, unlike delirium
  - Change in patient's usual level of functioning
  - Symptoms:
    - Recent memory loss
    - Language loss
    - Impairment of reasoning, judgment and calculation skills
    - Inability to move around safely
- Reversible
  - Causes:
    - Illnesses
      - Hyperthyroidism
      - Cushing's Syndrome
      - Vitamin deficiencies
      - Structural CNS
        - Hydrocephalus
- Irreversible
  - Alzheimer's Disease
    - Cerebral cortex becomes atrophied due to loss of brain cells
    - Patients forget to eat, become malnourished, immobile and develop infections
    - 2/3 of the elderly with chronic dementia have Alzheimer's

Depression

- Most common psych disorder in the elderly
- Causes:
  - Stress of multiple illnesses
  - Environmental changes
  - Bereavement, social rejection
- Symptoms
  - Lack of energy
  - Loss of appetite, libido
  - Poor self esteem
- 25% of suicides occur in patients > 65
- Watch for signs and symptoms of depression

Drug Induced Illness

- Accidental OD accounts for 30% of all drug induced admissions for the elderly
- Why?
  - Not compliant, forget, confused, vision, self selection
  - Multiple Rx from multiple PMD
  - New meds vs. old, half used
  - OTC Rx with cumulative effects
  - New habits, ETOH, exercise, diet

Drug Toxicity

- Common culprits
  - Lidocaine
  - Propanolol
  - Digitalis
  - Diuretics
  - Tricyclics
  - Anticoagulants
  - Narcotics
  - Theophylline

Elder Abuse

- Types:
  - Physical
    - Hitting, restraint
  - Psychological
    - Threats, humiliation
  - Financial or material
    - Theft, forced relocation
  - Neglect
    - Withholding Rx, food, assistance
- Characteristics
  - Victim
    - Women, 75 y/o, widow, one or more impairments, financially and physically dependant
  - Abuser
    - Relative (daughter), in residence, ETOH, anger with role, job or family crisis, psych history