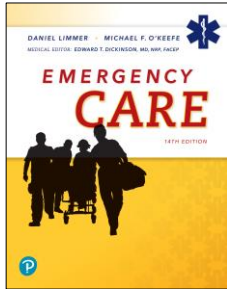


Emergency Care

Fourteenth Edition



Chapter 24

Infectious Diseases and Sepsis

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Topics

- [Infectious Diseases](#)
- [Sepsis](#)
- [Selected Common Communicable Diseases](#)

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Infectious Diseases

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How Diseases Spread (1 of 3)

- Infectious diseases
 - Bacteria
 - Viruses
 - Other microbes
- Communicable diseases
 - Direct contact
 - Contact with secretions

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How Diseases Spread (2 of 3)

- When an infection does cause illness, the time from exposure to development of the first symptoms is called the incubation period.
- The interval when the patient is shedding or releasing infectious material is the communicable period, when the microbe can be potentially transmitted.

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How Diseases Spread (3 of 3)

- Factors causing infection and illness after exposure
 - Virulence
 - Dose
 - Route
 - Body's resistance

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Sepsis

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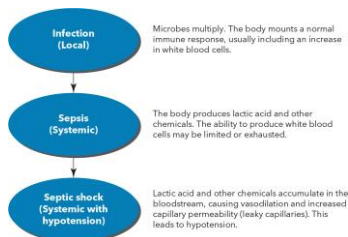
Pathophysiology (1 of 2)

- Sepsis is a life-threatening condition resulting from an abnormal and counterproductive response by the body that causes damage to tissues and organs.
 - The body overreacts and secretes substances that, instead of helping, hurt cells, tissues, and organs.
- Septic shock occurs when these changes result in shock and hypotension that do not respond to intravenous fluids.



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Pathophysiology (2 of 2)



[For long description, see slide 70: Appendix 1](#)

Stages of sepsis.



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Common Causes (1 of 2)

- Locations of body likely to be associated with sepsis
 - Lungs
 - Pneumonia
 - Gastrointestinal tract
 - Abdominal surgery
 - Pancreatitis
 - Genitourinary tract
 - Kidney or prostate infections
 - Urinary catheter



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Common Causes (2 of 2)

- Locations of body likely to be associated with sepsis
 - Skin
 - Long-term intravenous catheter
 - Tracheostomy
 - Gastrostomy tube
 - Pressures sores
- Much about sepsis still unknown



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Patient Assessment (1 of 2)

- Systemic inflammatory response syndrome (SIRS) criteria
 - Temperature
 - Lower than 96.8° F (36° C)
 - Higher than 101° F (38.3° C)
 - Heart rate over 90
 - Respiratory rate over 20
 - Systolic BP lower than 90 mmHg
 - New-onset altered mental status or worsened mental status



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Patient Assessment (2 of 2)

- Quick sepsis-related organ failure assessment (qSOFA)
 - Resembles SIRS criteria
 - Does not predict whether someone is septic
 - Predicts whether septic patient will have longer to stay in ICU or be more likely to die



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Patient Care

- Look for signs of sepsis in an infected patient.
- Provide supportive care.
- If patient meets SIRS or similar criteria, inform the ED (sepsis alert).



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Selected Common Communicable Diseases

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Patient Assessment and Care (1 of 2)

- Prevention
 - Appropriate vaccinations
 - Standard Precautions
- Assessment
 - Has the patient travelled?
 - Has the patient received recommended vaccinations?



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Patient Assessment and Care (2 of 2)

- Care
 - Understand how the patient feels.
 - Wear personal protective equipment.
 - Get further testing and/or receive preventative prophylactic antibiotics.



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Chickenpox (1 of 3)

- Caused by varicella-zoster virus (VZV)
- Signs and symptoms
 - Starts with vague symptoms resembling cold
 - Followed by fever and rash that itches and looks like blisters
- Very contagious
 - Direct person-to-person contact
 - Airborne from rash on skin or mucous membranes
 - Dried scabs do not spread disease.



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Chickenpox (2 of 3)



Child with chickenpox.



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Chickenpox (3 of 3)

- Treatment and prevention
 - Isolation of patients until lesions dry.
 - Antiviral medications to shorten course of disease and prevent complications
 - Vaccination
- Receive vaccine within 3 days of exposure.



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Measles (1 of 3)

- Also called rubeola, a highly infectious viral disease
- Signs and symptoms
 - Starts with fever, cough, eye irritation
 - Small white or bluish-white spots on inside of cheek (Koplik spots)
 - Red-blotchy rash



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Measles (2 of 3)



Measles rash.



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Measles (3 of 3)

- Easily spread
 - Inhaled droplets in air
 - Contact with nose and throat secretions
- No specific treatment
- Prevention
 - Vaccination
 - Quarantine
 - Hand hygiene



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Mumps (1 of 3)

- Caused by paramyxovirus
- Signs and symptoms
 - Starts with vague symptoms such as muscle aches, loss of appetite, headache
 - Progresses to swelling and inflammation of one or both parotids
 - Parotitis lasts 7 to 10 days



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Mumps (2 of 3)



Mumps showing characteristic parotid gland swelling. © David Effron, MD



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Mumps (3 of 3)

- Transmission
 - Droplets
 - Direct contact with saliva
- Prevention
 - Vaccination
 - Quarantine of patients for 5 days after swelling appears



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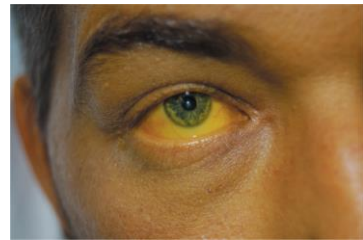
Hepatitis A (1 of 3)

- Hepatitis is a general term that means inflammation of liver
- Signs and symptoms
 - Fever
 - Nausea
 - Loss of appetite
 - Malaise
 - Abdominal pain
 - Jaundice a few days later
 - Generally worse in older patients



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Hepatitis A (2 of 3)



Jaundice from hepatitis A. © Edward T. Dickinson, MD



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Hepatitis A (3 of 3)

- Spread by fecal–oral route
- No specific treatment
- Prevention
 - Hand hygiene
 - Proper food preparation
 - Vaccination



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Hepatitis B (1 of 3)

- Infection with the hepatitis B virus (HBV) is very common in many parts of the world.
- Signs and symptoms
 - Nausea
 - Vomiting
 - Loss of appetite
 - Vague abdominal pain
 - Progresses to jaundice
 - Younger patients have fewer or no symptoms but much more likely to develop chronic infection.



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Hepatitis B (2 of 3)

- Transmission
 - Blood and any fluid that contains blood
 - Semen
 - Cerebrospinal fluid
 - Amniotic fluid
 - Vaginal secretions
 - A few other fluids



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Hepatitis B (3 of 3)

- No specific treatment
- Prevention
 - Vaccination
 - Proper decontamination of equipment after a call
- Postexposure actions
 - Wash exposure site with soap and water.
 - See health care provider right away.
 - Vaccination
 - Possible immune globulin injection



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Hepatitis C (1 of 2)

- Hepatitis C is very similar to hepatitis B in many ways.
- Signs and symptoms
 - Nausea
 - Vomiting
 - Loss of appetite
 - Vague abdominal pain



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Hepatitis C (2 of 2)

- Transmission
 - Bloodborne through shared needles
 - Less commonly through sexual intercourse or childbirth
- Several safe medication regimens but no vaccine
- Prevention
 - Standard Precautions
 - Proper use and disposal of sharps



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HIV/AIDS (1 of 4)

- Signs and symptoms
 - For some patients, flu-like symptoms within a few week of HIV infection
 - Fever
 - Sore throat
 - Fatigue
- AIDS characterized by opportunistic infections.
 - **Pneumocystis carinii**
 - Kaposi's sarcoma
 - Tuberculosis



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HIV/AIDS (2 of 4)



Kaposi's sarcoma. © Edward T. Dickinson, MD



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HIV/AIDS (3 of 4)

- Routes of transmission
 - Shared needles
 - Unprotected sex between men
 - Any penetrative activity involving blood and semen
 - During delivery or breastfeeding from mother to newborn



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HIV/AIDS (4 of 4)

- Antiviral medications reduce and suppress HIV viral load.
- Prevention
 - Standard Precautions
 - Public measures to reduce shared needle use and promote condom use
- Following significant exposure to blood or other body fluids
 - Wash the area.
 - Consult a health care provider.



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Influenza (1 of 3)

- Common viral illness
- Signs and symptoms
 - Fever
 - Nonproductive cough
 - Severe muscle aches
 - Sore throat
 - Headache
 - Severe weakness



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Influenza (2 of 3)



Child with influenza showing signs of a fever.



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Influenza (3 of 3)

- Spread by droplets or direct contact
- Antiviral medications lessen the severity and shorten but must be taken within 48 hours of symptom onset.
- Prevention
 - Hand hygiene
 - Surgical masks
 - Vaccination



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Croup (1 of 2)

- Also known as laryngotracheobronchitis, caused by human parainfluenza virus (HPIV)
 - Signs and symptoms
 - Inflammation and swelling of larynx, trachea, and bronchi
 - Children between 6 months and 3 years
 - Most susceptible
 - Present with history of upper respiratory infection that later produces characteristic seal bark cough.
 - Symptoms often worse at night



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Croup (2 of 2)

- Transmission by droplets from coughs or sneezes or that survive on objects
- Assess child as for any patient with shortness of breath.
- Prevention
 - Hand hygiene
 - Refrain from touching nose, eyes, and mouth.



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Pertussis (Whooping Cough) (1 of 2)

- Respiratory infection caused by **Bordetella pertussis** bacteria
- Signs and symptoms
 - Begins like a typical upper respiratory infection
 - Worsens into fits of uninterrupted coughing followed by “whooping” sound on inspiration



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Pertussis (Whooping Cough) (2 of 2)

- Spread by large droplets in air
- Treatment with antibiotics
- Prevention with vaccine
 - Hand hygiene
 - Refrain from touching nose, eyes, and mouth.



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Pneumonia (1 of 3)

- Signs and symptoms
 - Fever
 - Chills
 - Shortness of breath
 - Tachypnea
 - Pleuritic pain
 - Productive cough
 - Inflammation consolidated in part of lung on x-ray
 - Potential febrile seizures in young children and infants
 - Altered mental status common sign in elderly patients



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Pneumonia (2 of 3)



Chest X-ray showing inflammation in the lung. Note the area in the lower right lung that appears cloudy. This is where the pneumonia is located. © David Effron, MD



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Pneumonia (3 of 3)

- Spread by droplets but requires close contact of several days
- Treatment with antibiotics
- Prevention
 - Vaccination
 - Hand hygiene
 - Cough etiquette



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Tuberculosis (1 of 2)

- Caused by bacterium **Mycobacterium tuberculosis**
- Signs and symptoms
 - Cough (initially dry, later productive of purulent sputum)
 - Fever
 - Night sweats
 - Weight loss



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Tuberculosis (2 of 2)

- Spread by coughing, singing, or sneezing
- Treatment with antibiotics
- Prevention with vaccine
 - High index of suspicion
 - Airborne disease precautions including N-95 respirator



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Meningitis (1 of 3)

- Inflammation of meninges caused by bacterium **Neisseria meningitidis**
- Signs and symptoms
 - Abrupt onset of fever
 - Nausea
 - Vomiting
 - Severe headache
 - Nuchal rigidity
 - Photophobia
 - Possible petechiae



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Meningitis (2 of 3)



Petechial rash associated with meningitis. © Edward T. Dickinson, MD



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Meningitis (3 of 3)

- Spread by direct contact
- Treatment with antibiotics for meningococcal meningitis
- Prevention by vaccination



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Sexually Transmitted Infections (1 of 2)

- Viral STIs
 - HIV
 - Hepatitis A, B, and C
 - Genital herpes
 - Human papilloma virus (HPV)
- Bacterial STIs
 - Chlamydia
 - Gonorrhea
 - Syphilis



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Sexually Transmitted Infections (2 of 2)

- Prevention
 - Condoms
 - Vaccination
- STIs not a common reason for patients to access 911 emergency services except for women who develop pelvic inflammatory disease (PID).
 - Most commonly caused by gonorrhea or chlamydia
 - Causes severe lower abdominal pain that may or may not be associated with increased vaginal discharge



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Diseases Carried by Ticks

- Tick bites transmit Lyme disease.
- Most patients display rash (**erythema migrans**) within a week that looks like a bull's-eye.
- Treatment with antibiotics
- Prevention in backcountry rescue and wooded areas
 - Cover arms and legs.
 - Check frequently for ticks.
 - Remove ticks with tweezers.



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Emerging and Newly Recognized Infectious Diseases (1 of 3)

- In some cases, antibiotics that used to be effective no longer work.
 - Result of bacteria developing resistance
 - Patients may get infections that are no longer treatable, and patients may die from diseases that were easily cured a few years ago.
 - Use Standard Precautions to protect yourself, your co-workers, and other patients.



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Emerging and Newly Recognized Infectious Diseases (2 of 3)

- Recently emerged or newly discovered diseases
 - HIV/AIDS
 - Severe acute respiratory syndrome (SARS)
 - Ebola virus disease (EVD)
 - Middle East respiratory syndrome (MERS-CoV)
 - Zika virus



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Emerging and Newly Recognized Infectious Diseases (3 of 3)

- When the next outbreak occurs
 - Remain calm.
 - Understand that news reports may exaggerate the extent of the number of ill or the ease with which the disease is spread.
 - Follow the recommendations of the CDC and your local health department.



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Chapter Review



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Chapter Review (1 of 4)

- Sepsis is a life-threatening condition resulting from an abnormal and counterproductive response by the body that causes damage to tissues and organs. Septic shock occurs when these changes result in shock and hypotension that does not respond to intravenous fluids.
- Common sources of infections that lead to sepsis include the pulmonary system, gastrointestinal system, genitourinary system, and central nervous system.



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Chapter Review (2 of 4)

- The SIRS criteria are far from perfect, but may help in detecting sepsis. In a patient with an infection (either confirmed or suspected), look for:
 - Temperature lower than 96.8° F (36° C) or higher than 101° F (38.3° C)
 - Heart rate over 90
 - Respiratory rate greater than 20
 - Systolic blood pressure less than 90 mmHg
 - New-onset altered mental status or worsened mental status compared with normal



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Chapter Review (3 of 4)

- In the septic patient who does not need resuscitation, the most important thing you can do is notify the receiving hospital of a sepsis alert.
- When evaluating a patient with a fever or other signs and symptoms suggestive of an infectious disease, ask the patient about recent travel.



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Chapter Review (4 of 4)

- The most important and effective ways to avoid getting an infectious disease on an EMS call are to make sure you have the appropriate vaccinations and to use Standard Precautions.
- When new (or newly rediscovered) infectious disease outbreaks occur, follow the advice of the Centers for Disease Control and Prevention and your local health department.



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Remember

- Determine whether a patient potentially has sepsis using SIRS criteria and alert the ED staff if you have an index of suspicion for sepsis.
- Know what personal protective equipment you need to wear to prevent infection from different infectious diseases.



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Questions to Consider (1 of 2)

- What are the SIRS criteria?
- What body systems are the most common sources of sepsis?
- What is the difference between the incubation period and the period in which a disease is transmissible?



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Questions to Consider (2 of 2)

- Have you had the vaccinations you need to take care of patients without getting sick yourself?
- What are the differences in transmission routes, symptoms, severity of symptoms, prevention, and treatment among hepatitis A, B, and C?
- What are the symptoms of meningococcal meningitis? What is unusual about the rash?



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Critical Thinking

- A 2-year-old girl wakes her parents one night with a very loud cough that sounds like a seal barking. They have never experienced anything like this before and are near panic. How should you deal with this situation?



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Appendix 1

The three stages are as follows.

- Infection or local
- Sepsis or Systemic
- Septic shock or systemic with hypotension

Arrowheads extend downward from one stage to another.

In infection stage, microbes multiply. The body mounts a normal immune response, usually including an increase in white blood cells. In sepsis, the body produces lactic acid and other chemicals. The ability to produce white blood cells may be limited or exhausted. In septic shock, lactic acid and other chemicals accumulate in the bloodstream, causing vasodilation and increased capillary permeability (leaky capillaries). This leads to hypotension.

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