Pathogens can be classified as food-borne, airborne, blood-borne, or sexually transmitted.

Understanding infectious disease requires knowledge of the organ system, the portal of entry, and the infectious organism.

Patient histories are vital in diagnosing microbial diseases.

Zoonotic diseases are animal diseases accidentally transmitted to humans.

*Staphylococcus aureus and Streptococcus pyogenes* are common bacterial causes of skin infections. The organisms usually infect through broken skin.

*Methicillin-resistant S. aureus* (MRSA) has become an important cause of community-acquired staphylococcal infections.

*Necrotizing fasciitis* is usually caused by *S. pyogenes* but can be the result of other infections.

Infections of the skin can disseminate via the bloodstream to other sites in the body.

*Rubeola and rubella viruses* infect through the respiratory tract, but their main manifestation is the production of similar maculopapular skin rashes.

The mucociliary elevator is a primary defense mechanism used by the lung to avoid infection.

Pneumonia is caused by many microorganisms.

An elevated white cell count in blood is an indicator of bacterial infection.

Pneumococcal vaccine should be administered to the elderly because they are often immune-compromised.

Fungal agents commonly cause long-term, chronic infections.

Tuberculosis is an ancient yet reemerging bacterial disease with an increasing mortality rate caused by the development of multidrug-resistant strains, the susceptibility of HIV patients, and an increasing indigent population.

Localized infections in the lung can disseminate via the bloodstream to form metastatic lesions at other body sites.

Respiratory syncytial virus is one of several viruses that can cause lung disease but rarely disseminates.

Diarrhea leads to dehydration, for which fluid replacement is a critical treatment. Antibiotic treatment is usually not recommended.

Staphylococcal food poisoning is not an infection. It is a toxigenic disease.
Antibiotic treatments can sometimes cause gastrointestinal disease (for example, pseudomembranous enterocolitis by *Clostridium difficile*).

Bacteria that invade intestinal epithelial mucosal cells lead to the presence of red and white blood cells in fecal contents. This occurs with intracellular pathogens such as *Shigella*, *Salmonella*, and EIEC.

Bacteria that do not invade intestinal cells usually produce watery diarrhea. EHEC is an exception because the attachment and effacing lesions it produces result in bloody stools.

Bacterial toxins produced by bacterial enteric pathogens can cause systemic symptoms.

John Snow founded the science of epidemiology while studying a cholera outbreak in London.

The bacterium *Helicobacter pylori*, a common cause of gastric ulcers, lives in the stomach and is highly acid resistant.

Rotavirus is the single greatest cause of diarrhea worldwide.

*Giardia lamblia* is a major protozoan cause of diarrhea worldwide.

Urinary tract infections (UTIs) can result from ascending (to the kidney) or descending (from the kidney) routes of infection. The most common route leading to bladder infection, however, is through the urethra.

*E. coli* is the most common cause of UTI.

Syphilis, gonorrhea, and chlamydia are the most common sexually transmitted diseases.

A patient with one sexually transmitted disease often has another sexually transmitted disease.

Complement sensitivity prevents dissemination by *Neisseria gonorrhoeae*. In contrast, *N. meningitidis*, a cause of meningitis, frequently disseminates in the bloodstream because it is complement resistant.

HIV depletion of CD4+ T cells results in lethal secondary infections and cancers.

*Trichomonas vaginalis* is a flagellated protozoan that causes a sexually transmitted vaginal disease. The reservoirs for this organism are the male urethra and female vagina.

*Neisseria meningitidis* is resistant to serum complement because it produces a type-specific capsule. This allows the organism to reach and then cross the blood-brain barrier.

A vaccine for *N. meningitidis* is available, but none exists for *N. gonorrhoeae*.

Tetanospasmin causes spastic paralysis.
• **Botulism toxin** causes flaccid paralysis.
• **Serological diagnosis of an infectious disease** is possible if specific pathogen antibody titer rises fourfold between the acute and convalescent stages.
• **Spongiform encephalopathies** are believed to be caused by nonliving proteins called prions.

• **Blood cultures** are useful in diagnosing septicemia and endocarditis.
• **Endocarditis** can have acute or subacute onsets.
• **Subacute bacterial endocarditis** is usually an endogenous infection caused by *Streptococcus mutans*.
• **Malaria, caused by *Plasmodium species***, manifests as repeated episodes of chills, fever, and sweating owing to the organism’s ability to alter the antigenic appearance of its surface proteins and evade the immune response.

• **Septicemia** is caused by many Gram-positive and Gram-negative bacterial pathogens. It can start with the bite of an infected insect, introduction via a wound, escape from an abscess, or penetration of the mucosal epithelium by the pathogen (as through the intestine or vagina); it can lead to disseminated, systemic disease.
• **Plague** has sylvatic and urban infection cycles involving transmission between fleas and rats.
• **Yersinia pestis–infected flea bites** lead to bubonic plague. Bubonic plague can progress to septicemic and pneumonic stages.
• **Aerosolized respiratory secretions** will directly spread *Y. pestis* pneumatic plague from person to person (no insect vector).
• **Lyme disease** is caused by the spirochete *Borrelia burgdorferi*, which is transmitted from animal reservoirs to humans by the bite of *Ixodes* ticks.
• **There are three stages of Lyme disease:** stage 1, a bull’s-eye rash (erythema migrans); stage 2, joint, muscle, and nerve pain; stage 3, arthritis with WBCs in the joint fluid.
• **Hepatitis** is caused by several unrelated viruses; among them, HAV, HBV, and HCV account for most disease.
• **HAV** is transmitted by the fecal-oral route, does not establish chronic infection, and can be prevented by a vaccine.
• **HBV and HCV** can be transmitted by blood products (such as transfusions) and shared hypodermic needles and can lead to chronic hepatitis.
• **Vaccine for HBV**, but not HCV, is available.
• **Ebola virus** spreads from human to human and kills its victims quickly. Its viral proteins alter cytokine production and facilitate virus release from infected cells.

• **Vaccines** can be made from live attenuated organisms, killed organisms, or purified microbe components.

• **Herd immunity** can help protect unimmunized persons from diseases transmitted person-to-person.

• **Serious side effects** very rarely result from immunizations.

• **Tetanus is caused by C. tetani** and causes lockjaw, back muscle spasms

• **Influenza spreads** through air borne droplets disseminated from cough, cold and handshakes. Manifests into fever, cough and cold symptoms.