University of Basrah
Al-Zahraa Medical College

Ministry of Higher Education
and Scientific Research

Module: Student Selective Component (SSC)

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Lecture Title: Common Viral Infections in Iraq

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Learning Objectives (LO)

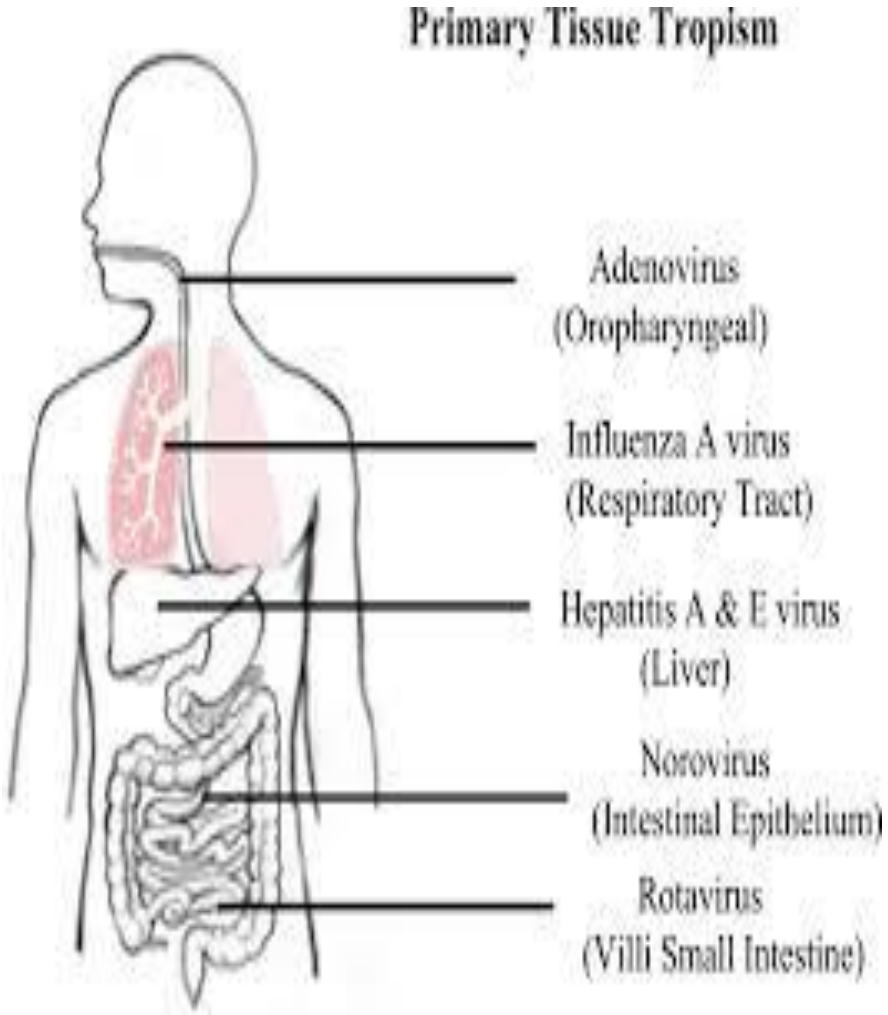
1. General Concepts of Viral Pathogenesis
2. Viral Infections of the Skin
3. Viral Infections of the Respiratory System
4. Viral Infections of the Gastrointestinal Tract
5. Viral Infections of the Circulatory System
6. Viral Infections of the Central Nervous System

How Do Viruses Cause Disease?

(LO 1)

Viral tissue tropism

Viruses are specific as to the type of cell that they can infect. For this reason, certain viruses cause only respiratory infections, whereas others cause only gastrointestinal (GI) infections, and so on.



How Do Viruses Cause Disease?

(LO 1)

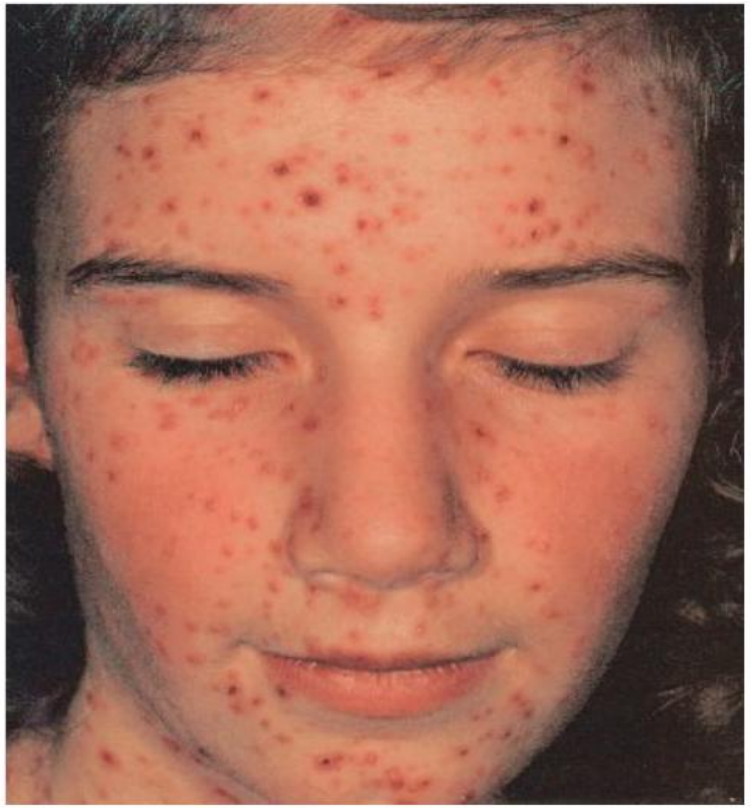
Cell destruction

Viruses multiply within host cells, and it is during their escape from those cells—by either cell lysis or budding—that the host cells are destroyed. This cell destruction leads to most of the symptoms of the viral infection, which vary depending on the location of the infection. Other symptoms are the result of immunological injury (i.e., injury that results from the immune response to the viral pathogen).

Viral Infections of the Skin

(LO 2)

- **Chickenpox (also known as varicella)** is an acute, generalized viral infection, with fever and a skin rash.
- Vesicles also form in mucous membranes. It is usually a mild, self-limiting disease.
- Serious complications include pneumonia, secondary bacterial infections, hemorrhagic complications, and encephalitis.



Chickenpox

Viral Infections of the Skin

(LO 2)

- **Shingles (also known as herpes zoster)** is a reactivation of the varicella virus, often the result of immunosuppression.
- Shingles involves inflammation of sensory ganglia of cutaneous sensory nerves, producing fluid-filled blisters, pain, and paresthesia (numbness and tingling).
- Shingles may occur at any age, but is most common after age 50.

Shingles

A.D.A.M.

Infection Control and Public Health

(LO 2)

Patient care. Use Airborne and Contact Precautions for hospitalized patients until their lesions become dry and crusted.

Pathogen. Chickenpox and shingles are caused by varicella-zoster virus (VZV); a herpes virus (family Herpesviridae) that is also known as human herpes virus 3; a DNA virus.

Reservoirs and mode of transmission. Infected humans serve as reservoirs. Transmission is from person to person by direct contact or droplet or airborne spread of vesicle fluid or secretions of the respiratory system of persons with chickenpox.

Laboratory diagnosis. Immunodiagnostic and molecular diagnostic procedures are available, as are cell culture and electron microscopy.

(LO 2)

German measles (rubella)

- German measles is a mild, febrile viral disease. A fine, pinkish, flat rash begins 1 or 2 days after the onset of symptoms.
- The rash starts on the face and neck and spreads to the trunk, arms, and legs. Rubella is a milder disease than hard measles with fewer complications.
- If acquired during the first trimester of pregnancy, rubella may cause congenital rubella syndrome in the fetus. This can lead to intrauterine death, spontaneous abortion, or congenital malformations of major organ systems.

Child with rubella

Infection Control and Public Health

(LO 2)

Patient care. Use Droplet Precautions for hospitalized patients until 7 days after the onset of rash.

Pathogen. Rubella is caused by rubella virus, an RNA virus in the family Togaviridae.

Reservoirs and mode of transmission. Infected humans serve as reservoirs. Transmission occurs by droplet spread or direct contact with nasopharyngeal secretions of infected people.

Laboratory diagnosis. Immunodiagnostic and molecular diagnostic procedures are available for diagnosis of rubella. The virus can be propagated in cell culture.

Measles (hard measles, rubeola)

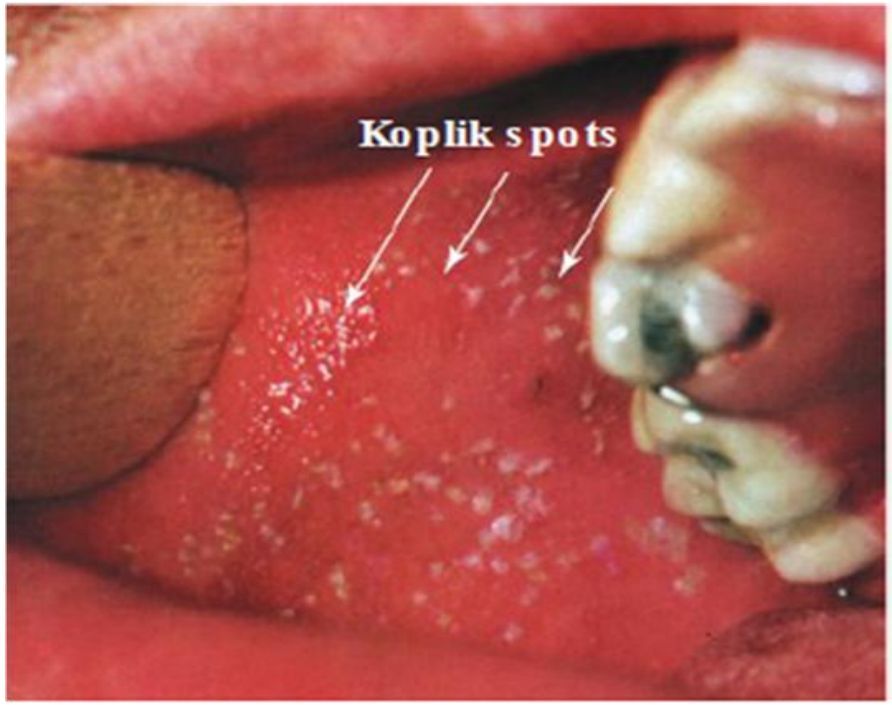
(LO-2)

- Measles is an acute, highly communicable viral disease with fever, conjunctivitis, cough, photosensitivity (light sensitivity), Koplik spots in the mouth, and red blotchy skin rash.
- Koplik spots are small red spots, in the center of which can be seen a minute bluish white speck when observed under a strong light.
- The rash begins on the face between days 3 and 7 and then becomes generalized.

Child with measles

Measles (hard measles, rubeola). (LO-2)

- Complications include bronchitis, pneumonia, otitis media, and encephalitis. Rarely, autoimmune, subacute, sclerosing panencephalitis (SSPE) may follow a latent period of several years.
- SSPE is characterized by gradual progressive psychoneurological deterioration, including personality changes, seizures, photosensitivity, ocular abnormalities, and coma.



Koplik s pots. Koplik s pots, which appear on the inner membrane of the cheek, are an early sign of measles; they usually appear prior to the onset of skin rash. Koplik spots are irregularly shaped, bright-red spots, often having a bluish white central dot.

Infection Control and Public Health

(LO 2)

Patient care. Use Airborne Precautions for hospitalized patients until 4 days after the onset of rash.

Pathogen. Measles is caused by measles virus (also known as rubeola virus). It is an RNA virus in the family Paramyxoviridae.

Reservoirs and mode of transmission. Infected humans serve as reservoirs. Airborne transmission occurs by droplet spread and direct contact with nasal or throat secretions of infected persons.

Laboratory diagnosis. Immunodiagnostic and molecular diagnostic procedures are available, and the virus can be isolated in cell culture.

(LO-3)

Viral Infections of the Respiratory System

The Common Cold (Acute Viral Rhinitis, Acute Coryza)

- The common cold is a viral infection of the lining of the nose, sinuses, throat, and large airways.
- Symptoms include coryza (profuse discharge from nostrils), sneezing, runny eyes, sore throat, chills, and malaise. Additionally, laryngitis, tracheitis, or bronchitis may accompany a cold.
- Secondary bacterial infections, including sinusitis and otitis media, may follow.
- The common cold occurs most frequently in fall, winter, and spring. On average, most people have one to six colds annually.

Infection Control and Public Health

(LO -3)

Patient Care. Use Droplet Precautions for hospitalized patients.

Pathogens. Many different viruses cause colds. Rhinoviruses, of which there are more than 100 serotypes, are the major cause in adults. Other cold-causing viruses include coronaviruses, parainfluenza viruses, respiratory syncytial virus (RSV), influenza viruses, adenoviruses, and enteroviruses.

Reservoirs and Mode of Transmission. Infected humans serve as reservoirs of infection. Transmission is via respiratory secretions by way of hands and fomites or direct contact with or inhalation of airborne droplets.

Laboratory Diagnosis. Laboratory diagnosis of the common cold usually is not required, but cell culture techniques can often demonstrate the specific viral pathogen.

(LO -3)

Influenza (flu)

- Influenza is an acute, viral respiratory infection with fever, chills, headache, aches, and pains throughout the body (most pronounced in the back and legs), sore throat, cough, nasal drainage.
- Influenza sometimes causing bronchitis, pneumonia, and death in severe cases. Nausea, vomiting, and diarrhea may occur, particularly in children.

Infection Control and Public Health

(LO -3)

Patient care. Use Droplet Precautions for hospitalized patients, usually for 5 days from onset of symptoms.

Pathogens. Influenza is caused by influenza viruses types A, B, and C. They are single-stranded RNA viruses in the family Orthomyxoviridae. Influenza A virus causes severe symptoms and is associated with pandemics and severe disease and more localized outbreaks. Influenza C virus usually does not cause epidemics or significant disease.

Infection Control and Public Health

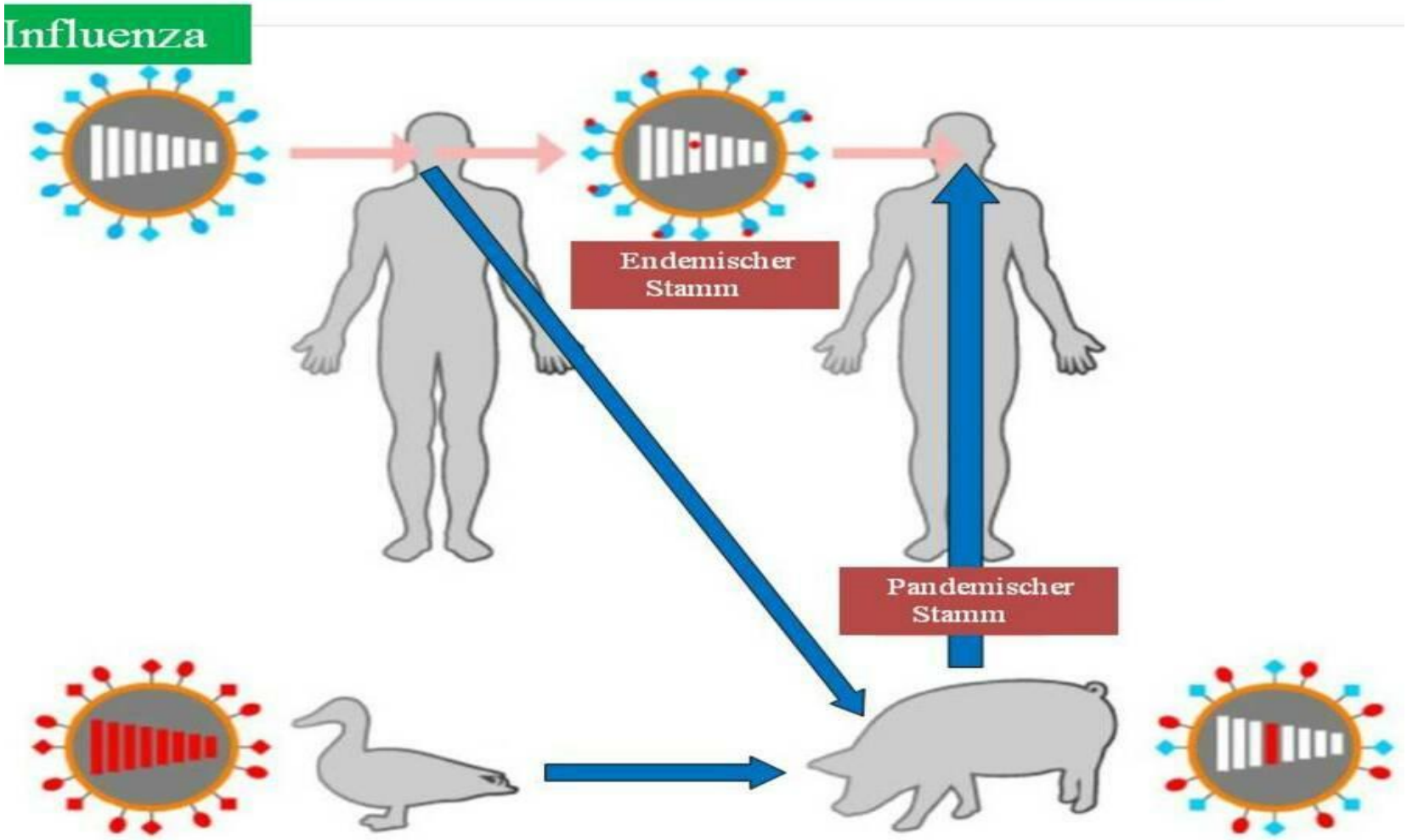
(LO -3)

Reservoirs and mode of transmission. Infected humans are the primary reservoir; pigs and birds also serve as reservoirs. Because pig cells have receptors for both avian and human strains of influenza virus, pigs serve as "mixing bowls," resulting in new strains containing RNA segments from both avian and human strains. Transmission occurs via airborne spread and direct contact.

Laboratory diagnosis. Influenza is diagnosed by isolation of influenza virus from pharyngeal or nasal secretions or washings using cell culture techniques, antigen detection, and demonstration of a rise in antibody titer (concentration) between acute and convalescent sera, or by molecular diagnostic procedures.

(LO -3)

Reassortment



Viral Infections of the Gastrointestinal Tract

(LO -4)

Viral Gastroenteritis (Viral Enteritis, Viral Diarrhea)

- Viral gastroenteritis may be an endemic or epidemic illness in infants, children, and adults. Symptoms include nausea, vomiting, diarrhea, abdominal pain, myalgia, headache, malaise, and low-grade fever.
- Although most often a self-limiting disease lasting 24 to 48 hours, viral gastroenteritis (especially when caused by a rotavirus) can be fatal in an infant or young child.
- Viral gastroenteritis is sometimes referred to as “stomach flu” or “24-hour flu,”.

Infection Control and Public Health (LO -4)

Patient Care. Use Standard Precautions for hospitalized patients.

Pathogens. The most common viruses infecting children in their first years of life are enteric adenoviruses, astroviruses, caliciviruses (including noroviruses), and rotaviruses. Those infecting children and adults.

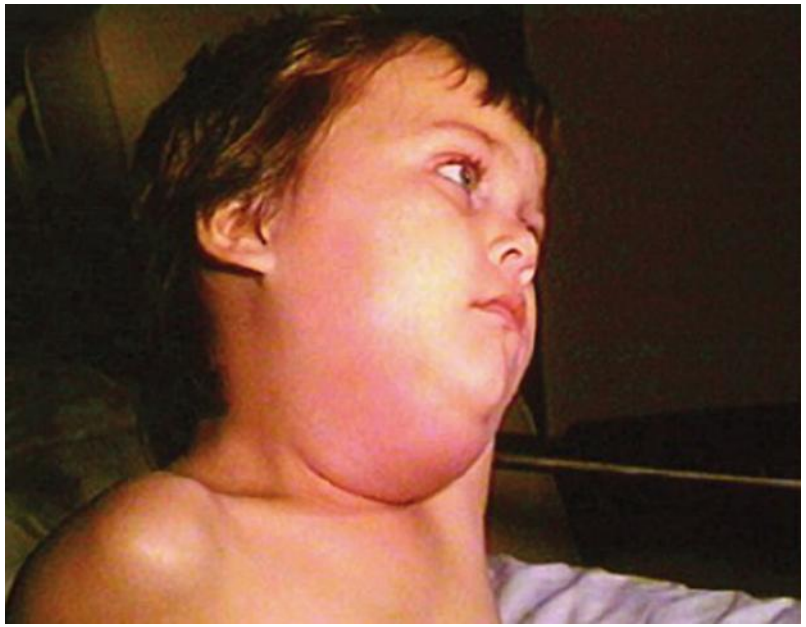
Reservoirs and Mode of Transmission. Infected humans are reservoirs of these viruses; contaminated water may also be reservoirs. Transmission is most often via the fecal–oral route. Airborne transmission and contact with contaminated fomites may cause epidemics in hospitals or cruise ships. Foodborne and waterborne transmission have been reported.

Laboratory Diagnosis. Diagnosis is by electron microscopic examination of stool specimens or by immunodiagnostic or molecular procedures.

Viral Infections of the Circulatory System

(LO -5)

- Mumps (infectious parotitis). Mumps is an acute viral infection characterized by fever and swelling and tenderness of the salivary glands.
- Complications can include orchitis (inflammation of the testes), oophoritis (inflammation of the ovaries), meningitis, encephalitis, deafness, pancreatitis, arthritis, nephritis, thyroiditis, and pericarditis.



Child with mumps.

(LO -5)

Infection Control and Public Health

Patient care. Use Droplet Precautions for hospitalized patients until 9 days after onset of swelling.

Pathogen. Mumps is caused by mumps virus, an RNA virus in the genus *Rubulavirus*, family Paramyxoviridae.

Reservoirs and mode of transmission. Infected humans serve as reservoirs. Transmission occurs via droplet spread and direct contact with the saliva of an infected person.

Laboratory diagnosis. Diagnosis of mumps is made using immunodiagnostic procedures or cell culture.

Viral hemorrhagic diseases.

(LO -5)

- Viral hemorrhagic diseases are extremely serious, acute viral illnesses. Initial symptoms include sudden onset of fever, malaise, myalgia, and headache, followed by pharyngitis, vomiting, diarrhea, rash, and internal hemorrhaging.

- **Patient care.** Standard, Droplet, and Contact Precautions for hospitalized patients for the duration of the illness.

Infection Control and Public Health (LO -5)

Pathogens. Viral hemorrhagic fevers are caused by many different viruses, including dengue virus, yellow fever virus, Crimean-Congo hemorrhagic fever virus, Lassa virus, Ebola virus, and Marburg virus.

Reservoirs and mode of transmission. Infected humans serve as reservoirs. Transmission is from person to person via direct contact with infected blood, secretions, internal organs, or semen, or by needles tick. Crimean-Congo hemorrhagic fever is a tickborne disease. Dengue fever and yellow fever are mosquito-borne diseases, transmitted primarily by mosquitoes in the genus *Aedes*.

Laboratory diagnosis. Viral hemorrhagic diseases are diagnosed using immunodiagnostic and molecular procedures, cell culture, or electron microscopy.

(LO -6)

Viral Infections of the Central Nervous System

- **Poliomyelitis (polio, infantile paralysis).** In most patients, poliomyelitis causes a minor illness with fever, malaise, headache, nausea, and vomiting.
- In about 1% of patients, the disease progresses to severe muscle pain, stiffness of the neck and back, with or without flaccid paralysis.
- Vaccines became available in the 1950s. The WHO is attempting to eradicate polio worldwide.

Infection Control and Public Health

(LO -6)

Patient care. Use Contact Precautions for hospitalized patients for the duration of illness.

Pathogens. Poliomyelitis is caused by polioviruses, RNA viruses in the family Picornaviridae (pico = small, RNA viruses).

Reservoirs and mode of transmission. Infected humans serve as reservoirs. Transmission is from person to person, primarily via the fecal–oral route; also, by throat secretions.

Laboratory diagnosis. Diagnosis of poliomyelitis is made by isolation of poliovirus from stool samples, cerebrospinal fluid (CSF), or oropharyngeal secretions using cell culture techniques or by immunodiagnostic or molecular diagnostic procedures.

“ We always work together as a team ”