Lecture 4
Selected Viral Diseases

- Viral diseases

Selected diseases
Respiratory Viruses

- **URT**
  - Common cold
  - acute viral rhinitis

- **LRT**
  - acute febrile respiratory disease
  - Hantavirus pulmonary syndrome
  - Influenza
Viral Pneumonia

- Adenoviruses, respiratory syncytial virus (RSV), parainfluenza viruses, cytomegalovirus (CMV), measles virus, chickenpox virus & other viruses
Common Cold, Acute Viral Rhinitis, Acute Coryza

- Viral infection of the lining of the nose, sinuses, throat, & large airways
- produces coryza (profuse discharge from the nostrils), chilliness, malaise (tiredness)
- may be accompanied by laryngitis &/or bronchitis, secondary bacterial infection, including sinusitis & otitis media
Common Cold, Acute Viral Rhinitis, Acute Coryza

Pathogen: many different viruses cause cold - over 100 serotypes of rhinoviruses, coronavirus, RSV, influenza viruses, parainfluenza viruses, etc.

http://www.topnews.in/healthcare/content/-21270scientists-chart-sequence-99-cold-virus-strains
Common Cold, Acute Viral Rhinitis, Acute Coryza

- Reservoir: human
- Transmission: direct contact, airborne droplets
- Inc Period: 12 hrs to 5 days. 12 hrs before & 5 days after onset of symptoms
- Control:
  - good hygiene. Avoid crowding.
  - vaccine- oral live adenovirus in military recruits
Common Cold, Acute Viral Rhinitis, Acute Coryza

- **Treatment**
  
  Patients - warm/comfortable & lots of fluids
  
  Temporary relief of symptoms - aspirin, acetaminophen, ibuprofen, nasal decongestants, antihistamines, steam inhalation, & cough suppressants
Influenza, Flu

- Specific, acute viral respiratory infection.
  - Fever, chills, headache, aches & pain throughout body, sore throat, cough, nasal drainage.
  - Sometimes bronchitis, pneumonia & death.
  - Nausea, vomiting & diarrhea may occur esp. in children.
Influenza, Flu

- Pathogen: Influenza viruses, types A, B, & C are RNA viruses-Orthomyxovirus family

- Influenza A associated with pandemics & widespread epidemics.

Figure 21.10
Antigenic Drift vs. Antigenic Shift

Figure 21.12- Antigenic shift event
Hantavirus Pulmonary Syndrome (HPS)

- Acute disease, fever, myalgia, GI complaints, cough, difficulties breathing, hypotension
- Pathogen: 5 different hantavirus strains (Sin Nombre, Bayou, etc)
- Reservoir: deer mouse, pack rats, chipmunk
Gastroenteritis
Enteritis Diarrhea

- Epidemic or endemic disease in infants, adults & children
- Nausea, vomiting, diarrhea, abdominal pain, myalgia, headache, malaise & low grade fever
- Rotavirus-diarrhea in dev countries
- Infants: adeno-, astro- & caliciviruses
- Children & adults: Norwalk, rotavirus
Viral hepatitis- inflammation of the liver
Caused by many hepatitis viruses-HAV, HBV, HCV, HDV, HEV, …etc
Also a result of other viral infections e.g., infectious mononucleosis, yellow fever, & cytomegaloviral infections
Acute hepatitis caused by HAV, HBV & HCV
Vaccines available for HAV & HBV
Viral Lymphatic & Cardiovascular Infections
Circulatory System

- AIDS- HIV
- Colorado tick fever- arthropodborne virus
- Infectious mononucleosis- EBV
- Mumps- mumps virus
- Viral hemorrhagic fevers
Infectious Mononucleosis “Mono”

- Acute viral disease
  - may be asymptomatic or with fever, sore throat, lymphadenopathy, splenomegaly, & fatigue
- Usually self-limiting, 1 to several weeks
- Rarely fatal
- Pathogen:
  - Epstein-Barr virus - a human herpes virus, known to be oncogenic-invades B cells
Infectious Mononucleosis “Mono” ..cont.

- **Reservoir:** Human
- **Transmission:** person to person “kissing disease”
- **Inc Period:** 4 to 6 weeks
- **Control:** avoid contact, std precaution for hospital
- **Treatment:** None, except rest & nutritious diet- avoid heavy lifting to prevent spleen rupture. Avoid aspirin
“Mono”
Mumps

- Acute viral infection- fever, swelling & tenderness of salivary glands
- Complications: orchitis (inf. of testis), oophoritis (inf. of ovaries), meningitis, encephalitis, deafness, P: Mumps virus (paramyxovirus) R: human
- Transmission: droplet spread & direct contact
- Inc Period: 12 to 25 days
- Control: MMR (measles-mumps-rubella) vaccine
- Treatment: none
Mumps Pathogenesis

1. Virus enters respiratory tract
2. Virus grows in salivary glands and local lymphoid tissue
3. Virus spreads to spleen and distant lymphoid tissue
4. Viremia
5. Virus spreads throughout body to testes, ovary, pancreas, thyroid, salivary glands

- 7-10 days
- Approx 15 days
- 18 days and after

DISEASE

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Meningitis & Encephalitis Viruses

- Several viruses cause these:
  - enteroviruses, coxsackieviruses, echoviruses, mumps viruses
  - also include arboviruses, polioviruses, adenoviruses, measles, herpes, & varicella viruses

- Arboviruses cause several forms of viral encephalitis - includes eastern & western encephalitis, St. Louis encephalitis & California encephalitis
Viral Hemorrhagic Diseases

- Extremely serious acute viral illnesses
- Sudden onset of fever, malaise, myalgia, headache
- Followed by pharyngitis, vomiting, diarrhea, rash, internal hemorrhaging
- Case fatality rates (50-90%)
Viral Hemorrhagic Diseases

- Pathogens: Ebola, Marburg, Lassa, yellow fever, dengue etc.
Infectious Disease of the CNS

- Viral nervous system infections
  - Poliomyelitis, infantile paralysis (poliovirus types 1, 2 & 3)
  - Rabies (rabies virus-a rhabdovirus)
Poliomyelitis

- Reservoir: human
- Pathogen: poliovirus types 1, 2 & 3-
  RNA enterovirus
- Transmission: person to person, fecal-oral
- Inc Period: 3 to 35 days
  - 7 to 14 days for paralytic cases
  - maximum extent of paralysis within 3 to 4 days after onset of symptoms
In most patients, minor illness with fever, malaise, headache, nausea & vomiting.

In about 1% patients-progresses to severe muscle pain, stiffness of neck & back, with or without flaccid paralysis. Major illness in older children & adults.
Poliomyelitis

- **Control:** immunize with IPV (injectable inactivated polio vaccine) or OPV (oral attenuated poliovirus vaccine). *(In US, only IPV)*

- Also standard precautions for hospitalized patients, adequate sewage & water treatment precautions
Rabies

- Usually fatal, viral encephalomyelitis of mammals
  - with mental depression, restlessness, headache, fever, malaise, paralysis, salivation, spasms of throat muscles, convulsion & death due to respiratory failure

- Pathogen: rabies virus
  - a rhabdovirus
Rabies

- **Reservoir:** wild & domestic animals
  - including dogs, foxes, coyotes, wolves, jackals, skunks, raccoons, mongooses & bats

- **Transmission:** bite of a rabid animal, airborne from bats in caves, person to person

- **Inc Period:** 3 to 8 weeks
Rabies

- **Diagnosis:** Virus isolation using cell culture techniques, or immunodiagnostic procedures, observation of Negri bodies in animal brain tissues
- **Treatment:** Prompt & proper treatment of bite wounds - administration of vaccine or human rabies immune globulin (HRIG) prior to development of symptoms
Rabies

Methods of Control:

- Vaccinate all pets, avoid potentially rabid animals
- Prophylactically vaccinate high risk individuals
- Standard precautions for hospitalized patients
Viral Diseases

- Genitourinary
- Skin
- Respiratory
- Gastrointestinal
- Circulatory
- CNS