

Introduction to Infectious Disease Epidemiology - STDs -

Pathogens

- Bacterial
 - About 1 million on the head of a pin
 - Salmonella, botulism, anthrax
- Viral
 - About 230 million HIV on the head of a pin.
 - Not affected by antibiotics
- Chemical toxins
 - Organic and inorganic
 - Allergens, carcinogens, neurotoxins
- Parasitic (multi-cell)
 - tapeworms, trichinosis, schistosomes
- Fungal
 - yeast infections, Candida
- Protozoa
 - Single cell organisms
- Prions
 - Relatively new discovery
 - Infectious agent with protein-like qualities
 - Thought to be responsible for mad cow disease), **Variant Creutzfeldt–Jakob disease (vCJD)** ; fatal degenerative brain disorder

Sexually Transmitted Diseases

- Most common include:
 - Chlamydia
 - Syphilis
 - Gonorrhea
 - Genital herpes
 - Genital warts (caused by the human papillomavirus)
 - Hepatitis B

PID Complications

- Pelvic Inflammatory Disease (PID) is a common complication of many STD's in women:
 - May be asymptomatic
 - When symptoms are present, they can be very severe and can include abdominal pain and fever
 - abscesses (pus-filled “pockets” that are hard to cure) and long-lasting, chronic pelvic pain
 - can damage the fallopian tubes enough to cause infertility or increase the risk of ectopic pregnancy

Chlamydia

- Caused by the bacterium, *Chlamydia trachomatis*
- The most frequently reported bacterial sexually transmitted disease in the United States
- Often undiagnosed due to lack of initial symptoms
 - about three quarters of infected women and about half of infected men have no symptoms. If symptoms do occur, they usually appear within 1 to 3 weeks after exposure.
- Symptoms include pain, discharge, bleeding.

Chlamydia

- Untreated women
 - About 40% of women develop PID
 - Can cause permanent damage to fallopian tubes, uterus, and surrounding tissue
 - 5 times more likely to become HIV infected if exposed.
 - Chlamydia is a leading cause of early infant pneumonia and conjunctivitis (pink eye) in newborns.
- Untreated men
 - Complications are rare
 - Sterility, eye infections, arthritis, skin lesions

Chlamydia

- Diagnosis
 - Urine or discharge specimen
- Treatment
 - A single dose of azithromycin or a week of doxycycline (twice daily) are the most commonly used treatments.
- Prevention
 - Retesting should be considered for women, especially adolescents, three to four months after treatment
 - Condoms can reduce infection risk

Syphilis

- Caused by the bacterium *Treponema pallidum*.
Most cases occur in people age 20 to 39
- About 3.5x more men than women
- Rates are decreasing in women but increasing about 12.5% in men due to MSM

Syphilis

- Transmission
 - Direct contact with syphilis sore (Genitals, lips, and mouth)
- Symptoms
 - May not present symptoms for years
 - Primary stage
 - Initial sore at point of contact within 90 days.
 - Secondary Stage
 - Non-itchy rash (appearing as red spots) on genitals, hands and feet
 - Swollen glands, hair loss, headaches, weight loss, muscle aches, fatigue
 - Latent syphilis
 - Initial symptoms disappear
 - Up to years later -- damage to internal organs and brain, nerves, eyes, heart, blood vessels, liver, bones, and joints
 - Symptoms include: difficulty coordinating muscle movements, paralysis, gradual blindness, and dementia, and death

Syphilis

- Diagnosis
 - Requires smear from chancre sore.
 - Dark field microscopy is used
 - Blood test to detect antibodies
- Implications
 - Genital sores (chancres) caused by syphilis make it easier to transmit and acquire HIV infection sexually. There is an estimated 2- to 5-fold increased risk of acquiring HIV infection when syphilis is present.

Syphilis

- Treatment
 - Syphilis is easy to cure in its early stages. A single intramuscular injection of penicillin, an antibiotic, will cure a person who has had syphilis for less than a year.
- Prevention
 - Abstinence
 - Avoid risky behavior
 - Condom use, although spermicide may cause lesions and increase risk.

Gonorrhea

- caused by *Neisseria gonorrhoeae*, a bacterium that can grow and multiply easily in the warm, moist areas of the reproductive tract, including the cervix, uterus, and fallopian tubes, and in the urethra in women and men. The bacterium can also grow in the mouth, throat, eyes, and anus.

Gonorrhea: Overview

- CDC estimates that more than 700,000 persons in the U.S. get new gonorrheal infections each year.
 - About $\frac{1}{2}$ are reported to CDC
- Transmission
 - Sexual contact
 - Highest reported rates of infection are among sexually active teenagers, young adults.

Gonorrhoea: Signs and Symptoms

- Males
 - May have no symptoms at all
 - 5 to 30 days after infection:
 - Burning sensation during urination
 - White, yellow, or green discharge
 - Swollen/painful testicals
- Females
 - Most have no symptoms
 - Often non-specific and mistaken for bladder or yeast infection
 - Initial symptoms and signs in women include a painful or burning sensation when urinating, increased vaginal discharge, or vaginal bleeding between periods
 - Sore throat

Gonorrhea: Complications

- Males
 - gonorrhea can cause epididymitis, a painful condition of the testicles that can lead to infertility if left untreated
 - can spread to the blood or joints
 - Increases risk of HIV infection
- Females
 - PID - abdominal pain and fever
 - can spread to the blood or joints
 - Increases risk of HIV infection

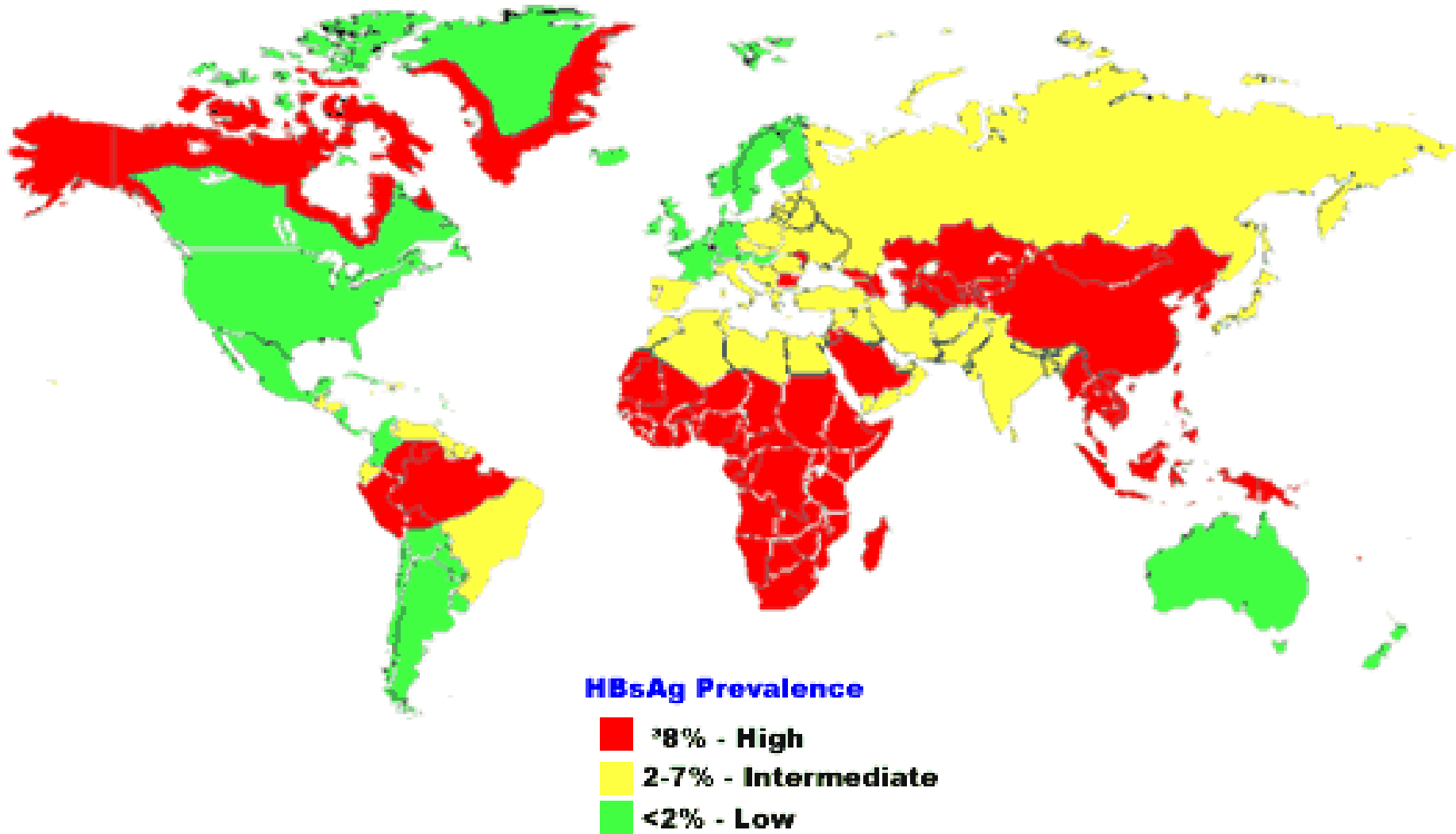
Gonorrhoea: Treatment and Prevention

- Diagnosis
 - Doctors office can perform a Gram stain of a sample from a urethra or a cervix allows the doctor to see the gonorrhoea bacterium under a microscope
- Treatment
 - Multiple antibiotics are generally used due to co-morbidity with chlamydia
 - Resistant strains are now being increasingly encountered

Hepatitis B

- Viral infection passed through bodily fluids from one person to another.
- High Risk Groups:
 - It is sexually transmitted disease
 - MSM
 - 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 ([view map](#))
 - Health care and public safety workers
Hemodialysis patients

Geographic Distribution of Chronic HBV Infection



Hepatitis B - Prevalence

- Number of new infections per year has declined from an average of 260,000 in the 1980s to about 78,000 in 2001.
- 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 B – Signs and Symptoms

- About 30% have no symptoms
- Symptoms include:
 - jaundice
 - fatigue
 - abdominal pain
 - loss of appetite
 - nausea, vomiting
 - joint pain
- Death from chronic liver disease occurs in 15-25% of chronically infected persons

Hepatitis B - Treatment

- [Adefovir dipivoxil](#), [alpha interferon](#), and [lamivudine](#) are three drugs licensed for the treatment of persons with chronic hepatitis B.
- These drugs should not be used by pregnant women.
- Drinking alcohol can make liver disease worse.

Hepatitis B – Prevention

- Vaccination is best defense for high-risk individuals. Recommended for public health and public safety workers.
- Effectiveness of condom use is unknown but they are likely to help protect against it.
- Reduce IV drug use / syringe sharing
- Discourage sharing of personal items (razors, etc.)
- Consider risks of tattoos and body piercing

Genital Herpes - Overview

- Genital herpes is a sexually transmitted disease (STD) caused by the herpes simplex viruses type 1 (HSV-1) and type 2 (HSV-2).
- Most genital herpes is caused by HSV-2. Most individuals have no or only minimal signs or symptoms from HSV-1 or HSV-2 infection. When signs do occur, they typically appear as one or more blisters on or around the genitals or rectum. The blisters break, leaving tender ulcers (sores) that may take two to four weeks to heal the first time they occur. the infection can stay in the body indefinitely
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Genital Herpes

- Prevalence
 - 45 million people ages 12 and older,
 - one out of five adolescents and adults, have had genital HSV infection.
 - Between the late 1970s and the early 1990s, the number of Americans with genital herpes infection increased 30 percent.
 - Genital HSV-2 infection is more common in women
 - approximately one out of four women
 - almost one out of five men
 - This may be due to male-to-female transmissions being more likely than female-to-male transmission.
 - HSV-1 can cause genital herpes, but it more commonly causes infections of the mouth and lips, so-called “fever blisters.” HSV-1 infection of the genitals can be caused by oral-genital or genital-genital contact with a person who has HSV-1 infection. Genital HSV-1 outbreaks recur less regularly than genital HSV-2 outbreaks.

Genital Warts

- Overview
 - Caused by Human Papillomavirus (HPV)
 - About 100 strains, of which 30 are sexually transmitted
 - High risk strains (about 10 of 30) can lead to abnormal pap smears and cause cancer of the cervix, vulva, vagina, anus, or penis
 - Low risk types may cause mild Pap test abnormalities or genital warts. Genital warts are single or multiple growths or bumps that appear in the genital area, and sometimes are cauliflower shaped.
- Prevalence
 - At least 50 percent of sexually active men and women acquire genital HPV infection at some point in their lives
 - By age 50, at least 80 percent of women will have acquired genital HPV infection
 - Most people will be asymptomatic and fight off infection on their own

Genital Warts

- Diagnosis
 - Visual inspection
 - Often appear within weeks or months of contact.
 - Usually appear as soft, moist, pink, or flesh-colored swellings, usually in the genital area. They can be raised or flat, single or multiple, small or large, and sometimes cauliflower shaped.
- Treatment
 - No cure, but they will often go away on their own
 - smears can help detect pre-cancerous conditions for early treatment
- Complications
 - Can cause cervical cancer
- Prevention
 - Abstinence, particularly during outbreaks
 - Effectiveness of condoms against HPV is unknown but condom use has been associated with a somewhat lower incidence of cervical cancer