Lecture 9

Sexually Transmitted Infections
HEAL 101: Health and Lifestyle
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Objectives
- Discuss the risk factors for infectious diseases
- Describe the most common pathogens
- Describe your immune system and how it works
- Discuss sexually transmitted infections
- Discuss Human Immunodeficiency Virus and Acquired Immune Deficiency Syndrome

Common Pathogens

Bacteria
- Large group of single-celled organisms. There may be 10x the number of bacteria on our bodies as we have cells
- Staph. infections (staph aureus), strep. infections (strep throat), most pneumonia, tuberculosis, typhus, salmonella, helicobacter pylori, e. coli, campylobacter

Viruses
- Smallest pathogens; minute parasitic microbes that live inside another cell. Viral diseases are difficult to treat
- Common cold, influenza (flu), mononucleosis, hepatitis, mumps, chicken pox and shingles, measles, rubella, rabies

Other Pathogens
- Fungi: primitive plants, cause infections such as athlete’s foot, jock itch, candidiasis
- Protozoa: microscopic, single-celled organisms; cause trichomoniasis, giardiasis
- Parasitic worms: largest of pathogens; tapeworms, pinworms
- Prion: self-replicating, protein-based agent that destroys brain cells (Mad Cow disease)
Routes of Disease Transmission

<table>
<thead>
<tr>
<th>MODE OF TRANSMISSION</th>
<th>ASPECTS OF TRANSMISSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Contact</td>
<td>Either direct (e.g., skin or sexual contact) or indirect (e.g., infected blood or body fluid)</td>
</tr>
<tr>
<td>2. Food- or water-borne</td>
<td>Eating or coming in contact with contaminated food or water or products passed through them</td>
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<tr>
<td>3. Airborne</td>
<td>Inhalation; droplet spread as through sneezing, coughing, or talking</td>
</tr>
<tr>
<td>4. Vector-borne</td>
<td>Vector-transmitted via secretions, biting, egg-laying, as done by mosquitoes, ticks, snails, fleas, etc.; depends on how infectious the organism is</td>
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<tr>
<td>5. Perinatal</td>
<td>Similar to contact infection; happens in the uterus or as the baby passes through the birth canal</td>
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Your Body’s Defenses: Keeping You Well

- **Nonspecific Defenses**
  - Physical Barriers: skin, mucous membranes, tears, saliva, low pH of urine, sweat
  - Macrophages: destroy pathogens, non-self cells
  - Inflammation: swelling, redness and heat
  - Fever: high body temps inhibit viruses and bacteria

- **Specific Defenses or Immunity**
  - T cells are activated to destroy *specific* antigens
  - Antibody-Mediated Immunity
    - B cells are activated to produce *antibodies* for specific antigens
  - Helper T Cells (CD4) determine which type of immune response is best - Very Important Cells
**Vaccination**
- Inoculation with killed or weakened pathogens or similar, less dangerous antigens in order to prevent or lessen the effects of disease

**Active Immunity**
- Develops from exposure to antigens in environment (having had a disease) or after administration of antigen via vaccine

**Passive Immunity**
- Antibodies naturally transferred from mother (placenta/breast milk); or clinically to help fight disease (rabies antibodies given after rabid animal bite)

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**Childhood Immunization Schedule**

<table>
<thead>
<tr>
<th>Vaccine Type</th>
<th>Age (months)</th>
<th>1</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>12</th>
<th>15</th>
<th>18</th>
<th>24</th>
<th>4-6</th>
<th>11-12</th>
<th>15-18</th>
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<tbody>
<tr>
<td>Hepatitis A</td>
<td>Birth</td>
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<tr>
<td>Diphtheria, Tetanus, Pertussis</td>
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<tr>
<td>Inactivated Polio</td>
<td>IPV</td>
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<tr>
<td>Measles, Mumps, Rubella</td>
<td>MMR 1</td>
<td>MMR 2</td>
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<td>Varicella</td>
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<tr>
<td>Pneumococcal</td>
<td>PCV</td>
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<td>Hepatitis A</td>
<td>Hepatitis A series</td>
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<tr>
<td>Influenza</td>
<td>Influenza (yearly)</td>
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**Sexually Transmitted Infections**

- Annually increasing among young people
- Causes:
  - Unprotected sexual activity
  - Casual attitude about sex, promiscuity
  - More sexual partners = greater risk for STIs
Common Sexually Transmitted Infections

- Bacterial
  - Chlamydia
  - Gonorrhea
  - Syphilis
- Viral
  - Human Papilloma Virus
  - Herpes Simplex Virus
  - HIV and AIDS
- Other
  - Pubic Lice
  - Vaginitis/Yeast
  - Trichomonas

Modes of STI Transmission

- Penile-vaginal intercourse
- Oral-genital contact
- Hand-genital contact
- Anal intercourse
- Sleeping on sheets infested with lice or scabies

STI Symptoms

**Men and Women**
- Sore bumps or blisters near urethra or mouth
- Burning or pain when urinating
- Swelling or redness in throat
- Fever, chills, aches
- Swelling of lymph nodes near genitalia or swelling of genitalia
- Need to urinate frequently

**Men Only**
- A drop or drainage from penis

**Women Only**
- Vaginal discharge or odor from the vagina
- Pain in the lower pelvis or deep in the vagina during sex
- Burning or itching around the vagina
- Bleeding from the vagina at times other than the regular menstrual periods

Chlamydia

- 3 Million annual cases
- NGU or NSU– non-specific gonorrhea or non-specific urethritis may be classified as chlamydia
- Women – 70% asymptomatic
- Chlamydia can cause conjunctivitis, pelvic inflammatory disease, miscarriage, stillbirth, injury to fallopian tubes/inner pelvic structure; sterility
- Treated with tetracycline
Pelvic Inflammatory Disease

- .5 - 1 Million annual cases
- Infection of uterus, fallopian tubes, ovaries; pelvic cavity; ectopic pregnancy; chronic pelvic pain and recurrent infections
- Risk factors: substance abuse, young age at first sexual intercourse, multiple partners,
- Treatment: antibiotics

Gonorrhea

- Bacterial cocci - 650,000 annual cases
- Spread by body fluids during sexual activity
- Males mostly symptomatic – females mostly asymptomatic
- Very similar to Chlamydia
- Treatment: penicillin; streptomycin

Gonorrhea Discharge from Penis

Syphilis

- 70,000 causes annually
- Bacterial spirochete: transmitted by direct contact
- Primary Syphilis: chancre ~1 week after exposure
- Secondary Syphilis: months later, rash, fever, hair loss
- Latent Syphilis: symptoms reappear 2-4 years after secondary period
- Late (Tertiary) Syphilis – years later, may develop heart damage, central nervous system damage, blindness, deafness, insanity
- Treatment: antibiotics
Genital HPV

- Genital warts or condyloma
- 5.5 million annual cases
- Caused by human papilloma virus
- Warts appear 6-8 weeks after contact
- Many have no symptoms – may be in reproductive tract
- Can be full blown genital warts or flat warts
- Risks of warts – obstruct urinary flow; implicated in cervical cancer; threat to fetus exposed during birth

Treatment for Genital Warts

- Covered with podophyllin for several weeks which dries them
- Cryosurgery - liquid nitrogen “freezes” tissue
- Laser surgery for larger warts
- Creams of 5 fluorouracill may prevent precancerous cell development
- Interferon injections
- Prevention via Gardasil vaccine
  - Protects against 4 types of HPV which cause 90% of warts cases and 70% of cervical cancer cases

Genital Warts - Penis

Genital Warts - Vulva
Genital Warts
Penis and Buttocks

Herpes Simplex Virus I and II

- Exchange of saliva or sexual contact can transmit virus
- Type I and Type II can affect oral or genital regions, remains in nerve ganglion indefinitely
- Burning, redness, blisters appear

Herpes Simplex Virus I and II

- Especially serious in pregnancy – may be passed to infant during birth
- Increases risk for cervical cancer
- No cure:
  - Antiviral drugs reduce symptoms, duration of outbreaks
- Decrease risk: Condoms, abstain when sores are present or pain in oral/genital region, identify outbreak triggers, don’t share lip balms or lipstick

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Herpes on Penis

Pubic Lice

- "Crabs" – parasite found in pubic hair
- Egg deposits – nits or eggs hatch 1-2 weeks after deposit
- Treatment: lousicide shampoo with repeat within 2 weeks
- Sexual contact most common mode of transmission, also contact with sheets in hotel, dormitory rooms
Pubic Lice

"Hatched Dead Egg": The cap is gone and the shrunked, dead embryo is still inside the casing.

Viable Nit

Gnyle on Hair Strand

University of Nebraska Department of Entomology

Pubic Lice vs. Head Lice

Vaginitis Conditions

- **Candidiasis** (yeast) – 500,000 cases yearly
- May occur if woman has
  - diabetes
  - has low immunity
  - takes oral contraceptives
  - uses broad spectrum antibiotics
  - uses deodorant soaps; wears tight clothing
- Symptoms include: severe itching/burning
- Treatment: antifungal drugs
Vaginitis Conditions

- **Genitourinary tract infections** – can be transmitted sexually; can be transmitted to bladder; autoinoculation
- **Trichomoniasis** – protozoan transmitted by men and women
- Foamy, yellowish, unpleasant discharge, burning, itching and pain at intercourse
- Can be spread by toilet seats; sexual intercourse; locker room bench; wet towels, other items with discharged fluids on them
HIV/AIDS

- HIV = **Human Immunodeficiency Virus**
- AIDS = **Acquired Immune Deficiency Syndrome**
- AIDS present from 1950s – began to flourish in USA in 1981
- Rare disorders appeared
- 1984 retrovirus HIV identified and linked with the disease AIDS
- Understand difference between being HIV+ and AIDS

HIV “Hijacks” immune cells (Helper T) - immune system declines
- Process may take many years
- As immune system declines, patient is at risk for many illnesses
- Presence of HIV and any of the below = AIDS diagnosis
  - Pneumosystis Carinii Pneumonia (PCP)
  - Kaposi’s Sarcoma (KS)
  - Tuberculosis (TB)
  - Cervical Cancer
  - Cytomegalovirus (CMV)
  - Toxoplasmosis
  - Candidiasis (Thrush)
  - Other conditions (i.e., CD4 count < 200)
4-10 times more likely than men to contact HIV through unprotected sex with infected partner

HIV can enter mucous membranes in vaginal tract easier than the penis

Vagina may incur micro tears during intercourse – opening for HIV infection

During intercourse, woman exposed to more semen than male exposure to vaginal secretions

Women may have STIs and be unaware; STIs increase risk of HIV transmission

Women of color are 76% of AIDS cases in U.S.
Concerns For Women

- Women have been underrepresented in clinical trials
- Women are subordinate to men in many nations, reducing her decision making abilities and power to negotiate safe sex
- Women are more economically dependent, which lessens ability to seek treatment
- In the U.S., HIV positive women are more likely than HIV positive men to be younger and less educated
Over 7000 new HIV infections a day in 2009

- About 97% are in low and middle income countries
- About 1000 are in children under 15 years of age
- About 6000 are in adults aged 15 years and older, of whom:
  - almost 51% are among women
  - about 41% are among young people (15-24)

2009 global HIV and AIDS estimates
Children (<15 years)

<table>
<thead>
<tr>
<th>Description</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children living with HIV</td>
<td>2.5 million [1.6 million – 3.4 million]</td>
</tr>
<tr>
<td>New HIV infections in 2009</td>
<td>370 000 [230 000 – 510 000]</td>
</tr>
<tr>
<td>Deaths due to AIDS in 2009</td>
<td>260 000 [150 000 – 360 000]</td>
</tr>
</tbody>
</table>

How HIV is Transmitted

- Direct contact with infected body fluids such as: blood, semen, vaginal secretions that gain entry through mucous membranes of urethra, vagina, penis or anus
- Receiving a blood transfusion prior to 1985 was a risk for contracting HIV — today, blood is screened and much more safe
- Injecting drugs or contaminated needles
- Mother to infant transmission perinatally – in the womb, during delivery or via breast feeding
- Needle stick or blood splash in health care setting

How HIV is NOT Transmitted

- Touching or hugging
- Sharing household items such as utensils, towels and bedding
- Contact with sweat or tears
- Sharing swimming pools, saunas, hot tubs
- Insect bites
- Coughs or sneezes
- Someone preparing a meal for you
- Being friends or working with an HIV infected person

Preventing HIV

- Vaccine search since 1993 – no success
- Protect against transmission by making good choices!