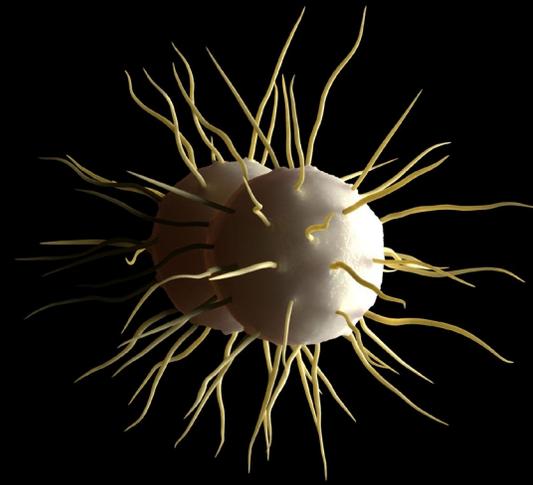


Sexually Transmitted Infections: Where and Why?

by

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Background

Sexual education is commonly underappreciated in today's society. Access to adequate sex education is crucial to stopping the spread of sexually transmitted infections (STIs). Awareness about the body and sexual health is a basic human right that is unfortunately unavailable to certain communities throughout the modern world, including within the United States, Asia, as well as within several countries in Africa where STI infection rates have soared over the recent years. It is important to note that although some of the STIs introduced in this case study are more prevalent in certain regions of the world, they are still universally present.

In this case study we are going to examine four of the most widely prevalent STIs in the world today: human immunodeficiency virus (HIV), hepatitis B, chlamydia, and gonorrhea. Please read the following information carefully and be prepared to play the role of a doctor in class.

Human Immunodeficiency Virus (HIV)

Human immunodeficiency virus (HIV) is a viral infection that targets the immune system. Specifically, the virus attacks a type of white blood cell known as a CD4⁺ T-cell. These cells are extremely important in the body's immune response against infections because they can target viruses or bacteria that have entered the body and signal other cells to destroy them. Without a sufficient number of healthy CD4⁺ cells, the body will not be able to fight off infections. This means that in an HIV-positive individual, infection with something even as common as the flu will be much more serious, because that individual will lack enough CD4⁺ cells to fight off the flu virus. This individual would thus be classified as someone who is *immunocompromised*, meaning that their immune system has been weakened. The flu infection that this individual gets would be classified as an *opportunistic infection*, which is an infection that occurs due to a weakened immune system. Immunocompromised individuals are more susceptible to infection by other STIs. *Co-infection* occurs when an individual has more than one type of active infection at a time.

In an HIV-infected individual, the virus is present in bodily fluids such as semen, blood, vaginal fluids, rectal fluids, and breastmilk. Therefore, HIV can be transmitted via sexual intercourse, sharing of needles due to contact with infected blood, as well as from mother to child during pregnancy and breastfeeding.

HIV infection is characterized by three stages: acute infection, chronic latency, and AIDS. During the acute infection stage, which usually lasts between two to four weeks, the virus rapidly multiplies and infects CD4⁺ T-cells. In this stage, the individual experiences symptoms that are very similar to the common flu, and may include a fever, rash, or chills. These flu-like symptoms are followed by a chronic latency stage in which the virus very gradually multiplies and reproduces in the host, thus remaining "dormant" and producing no physical symptoms. The final and most severe stage of HIV infection is classified as autoimmune deficiency syndrome (AIDS). This stage is characterized by an increase in viral load (number of viruses per cubic millimeter of blood) and a dramatic decrease in the number of CD4⁺ T-cells in the blood. To be officially diagnosed with AIDS, the individual's CD4⁺ T-cell count must be lower than 200 CD4⁺ T-cells per mm³ of blood.

HIV and other STIs are common in Africa, with 70% of worldwide HIV infections concentrated in the sub-Saharan region. South Africa has seen an increasing problem in STI transmission, making it the country with the largest current HIV epidemic. A combination of cultural attitudes, socioeconomic factors, and resource availability have contributed to the significantly higher prevalence and incidence rates of HIV in sub-Saharan Africa compared to the Saharan region, where conservative attitudes and government-imposed social restrictions are more strongly upheld.

HIV treatment includes anti-retroviral therapy (ART), which is a combination of different types of drugs that aims to target and prevent viral replication. Although effective, ART can be very expensive, and thus may not be an accessible treatment option for certain communities around the world. HIV can be prevented by abstinence (not engaging in sexual activity), monogamy (having only one sexual partner), and safe sex practices such as condom use. There is currently no vaccine for HIV.

Hepatitis B

Hepatitis B (HepB) is an infection of the liver that is caused by the hepatitis B virus (HBV). Infection with the virus for the first six months is known as acute hepatitis B. If the infection is still present after six months, the condition is characterized as chronic hepatitis B. Symptoms of infection may include fever, weakness and fatigue, nausea, loss of appetite, dark urine, and jaundice (yellowing of the skin and the whites of eyes). HepB can be transmitted via sexual contact due to contact with infected semen or vaginal fluids, and sharing of needles due to contact with infected blood. HepB can also be passed from mother to child through pregnancy as well as breastfeeding via infected breast milk.

Hepatitis B is most common in Asia. It has a high prevalence primarily in China, followed by Southeast Asia and sub-Saharan Africa. Nearly a third of all HepB cases worldwide are in China alone. Furthermore, Asian Americans and Pacific Islanders make up 50% of all HepB cases in the United States.

Acute hepatitis B usually does not require treatment, because the virus can eventually be cleared from the body by the immune system. For chronic hepatitis B, antiviral medications may be used for treatment to help slow viral reproduction. Hepatitis B can be prevented with abstinence, monogamy, and use of safe sex practices. The HBV vaccine is another method of prevention. The HBV vaccine is highly effective, and widespread international HBV vaccination has become a major effort of the World Health Organization.

Chlamydia

Chlamydia is a bacterial STI that is prevalent throughout the world, but presents with high incidence rates of around 100 million cases per year in Africa and South Asia. In the United States, chlamydia is more prevalent in the southeastern states. Because most people with the STI do not show symptoms, the bacterium can easily be transmitted without individuals being aware that they are infected. If symptoms do show, they are often characterized by a burning sensation during urination, swollen testicles in men, or abnormal genital discharge. The bacterium can cause infections of the genitals, urethra, cervix, eyes, mouth, and throat. If left untreated, chlamydia can have serious consequences such as pelvic inflammatory disease, infertility, sterility, and miscarriages.

The primary mode of transmission is through sexual activity (vaginal, anal, oral) or contact with infected tissue. The disease is relatively common in both developed and underdeveloped regions of the world. Infection with chlamydia increases susceptibility to deadlier STIs such as HIV. This is because the chlamydia bacteria cause inflammation and damage of tissues in the reproductive tract, making it easier for HIV to enter the body.

Treatment of chlamydia includes the use of antibiotics for about one to two weeks, or longer depending on the severity of infection. The risk for chlamydia can be lowered or prevented by abstinence, monogamy, or safe sex practices.

Gonorrhea

Gonorrhea is a bacterial STI that is also prevalent throughout the world. It is the second most common STI in the United States, the first being chlamydia. Although the overall incidence rate has been decreasing, the STI is more

prevalent in the southeastern states than in the rest of the United States. Outside of the United States, gonorrhea is most prevalent in Africa and South Asia.

Gonorrhea is equally common in men and women. Somewhat similar to chlamydia, Gonorrhea does not always present with symptoms and is primarily transmitted through sexual activity (vaginal, anal, oral) due to contact with infected semen, rectal or vaginal fluids. If symptoms do occur, they may include burning with urination, swollen testicles in men, or abnormal genital discharge.

Treatment of gonorrhea also includes the use of antibiotics, and the risk of infection can be lowered or prevented by abstaining from sex, practicing monogamy, or using safe sex practices.



Doctor-Patient Role-Play Activity

In this activity, you (the student) will be taking on the role of a doctor to help diagnose a patient that will be presented in class. As an infectious disease specialist, you represent an important interface between the patient and medical care. Your role requires you to interact with the patient to put together a patient history, and use this history to develop a diagnosis by ordering appropriate tests.

Patient History

Perhaps the most important action a doctor can take is to listen to the patient. They are a crucial source of information, much of which cannot be obtained by other means. Begin by asking more generalized questions to determine the reason for the patient's visit. It should be noted that while you are gathering general information, you should also ask direct questions that provide useful information. Examples are provided below:

- What brings you in today?
- How are you/have you been feeling?
- Can you describe your symptoms?

A common mnemonic used for pain symptoms that can be applied widely is OPQRST:

- *Onset*: Did your symptoms begin all at once or gradually?
- *Provocation*: Does anything make them better or worse?
- *Quality*: Could you describe how it feels?
- *Region/Radiation*: Where do you feel your symptoms (especially pain)?
- *Severity*: Rate on a scale of one to ten.
- *Time*: When did your symptoms begin?

After evaluating a patient for these symptoms, it is important to ask about the patient's sexual history, although care should be taken as this is typically a sensitive subject.

- Have you had any unprotected sex? Or sex with multiple partners?
- Do you engage in activities that involve needle (drug use)? Do you share needles?
- Have you had any exposure to the bodily fluids of someone with HIV?

Diagnostic Tests

Your tests should help you evaluate your suspicions, but also account for the possibility of other diagnoses. It is crucial to avoid becoming focused on one particular diagnosis without first having comprehensive evidence demonstrated by test results.

- *Antigen/antibody immunoassay*: This test is commonly used to determine presence of antibodies in the blood. It should be noted that this may be negative in the early days of infection as the immune response takes time to develop.
- *Viral load*: This test can be used to determine the presence of HIV or HBV in the blood.
- *Complete blood count (CBC)*: This test provides a breakdown of the components of the patient's blood. It provides information about CD4⁺ and CD8⁺ T-cell levels in the blood. Normal CD4⁺ T-cell values in a healthy individual range from 500–1,500 per cubic millimeter of blood.
- *Comprehensive metabolic panel*: This test gives information about the overall health of the patient and highlights metabolic abnormalities in the liver or kidneys.

This is the end of the pre-class reading assignment. Please bring the table on the next page to class for use during the in-class activities.

<i>Disease</i>	<i>Bacterial or viral?</i>	<i>Endemic area</i>	<i>Modes of transmission</i>	<i>Ratio of infected to total students in endemic area</i>	<i>Ratio of non-infected to total students in endemic area</i>	<i>Why is the infection common in the endemic area?</i>	<i>Possible prevention methods for reducing rates of infection</i>
<i>HIV</i>							
<i>Gonorrhea</i>							
<i>Chlamydia</i>							
<i>Hepatitis B</i>							