COURSE DESCRIPTION

In the U.S., sexually transmitted diseases (STDs) represent a major public health challenge. If not diagnosed and treated early, many STDs can cause serious health issues, such as infertility, cancer, organ damage, and even death. This CE course will provide information on the symptoms, diagnosis, treatment, complications, and prevention of the following STDs.

- bacterial vaginosis
- chlamydia
- gonorrhea
- hepatitis B/hepatitis C
- genital herpes
- human immunodeficiency virus
- human papilloma virus
- syphilis
- trichomoniasis

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OBJECTIVES

Upon completion of this continuing education course, the professional should be able to:

1. Identify the importance of sexually transmitted diseases (STDs) in the United States.
2. Describe the symptoms, diagnosis, treatment, complications, and prevention of the following STDs:
   - bacterial vaginosis,
   - chlamydia,
   - gonorrhea,
   - hepatitis B/hepatitis C,
   - genital herpes,
   - human immunodeficiency virus,
   - human papilloma virus,
   - syphilis, and
   - trichomoniasis.
3. Compare and contrast the appearance of genital lesions caused by STDs.
4. List other STDs seen in the United States.

Disclaimer

The writers for NCCT continuing education courses attempt to provide factual information based on literature review and current professional practice. However, NCCT does not guarantee that the information contained in the continuing education courses is free from all errors and omissions.
INTRODUCTION

Sexually transmitted diseases (STDs) are also known as sexually transmitted infections (STIs). STDs are infections that are transferred from one person to another through sexual contact. STDs can be transmitted during vaginal, anal, or oral sex. They can also be transmitted from an infected mother to her baby during pregnancy or childbirth.

STDs are a major public health challenge in the United States (U.S.). The Centers for Disease Control and Prevention (CDC) estimates that there are approximately 19 million STD infections each year. These infections cost the U.S. healthcare system about $16.4 billion per year and cost the infected individuals even more in terms of acute and long-term health consequences.

There are more than 30 different sexually transmissible bacteria, viruses, and parasites. Per state law, physicians are required to report certain STDs to the state health departments. Most states require reporting of newly diagnosed cases of chlamydia, gonorrhea, and syphilis.

This CE course will describe the most important STDs found in the U.S.: bacterial vaginosis, chlamydia, gonorrhea, hepatitis B/hepatitis C, genital herpes, human immunodeficiency virus, human papilloma virus, syphilis, and trichomoniasis.

BACTERIAL VAGINOSIS

General Information

Bacterial vaginosis (BV) is the most common type of vaginal infection. The CDC considers BV a sexually transmitted infection but it is not transmitted by sexual intercourse. However, it is more common in women who are sexually active, especially after intercourse with a new partner. Women who have not had sexual intercourse may also develop BV. Douching has also been implicated in the development of BV.

BV occurs when the normal balance of bacteria in the vagina is disrupted and replaced by an overgrowth of certain other bacteria. Normally the vagina has both “good” types of bacteria (Lactobacillus spp.) and “bad” types of bacteria (Gardnerella vaginalis and Mobiluncus spp.). The good bacteria keep the bad bacteria in control. For reasons not yet clear to researchers, in BV the Gardnerella vaginalis and/or Mobiluncus spp. take over and outnumber the Lactobacillus spp. Other bacteria implicated in BV include Bacteroides spp. and Mycoplasma spp.

Symptoms

The most common symptom of BV is a homogenous off-white vaginal discharge with a fishy smell. Some women report pain, itching, and/or burning.
**Diagnosis**

Diagnosis of BV is usually made in the doctor’s office. A speculum is inserted into the vagina and at least two cotton-tipped swabs are collected from high in the vagina for testing. The following three criteria must be met.

1. Presence of a thin off-white homogeneous discharge.
2. pH of vaginal fluid >4.5; Measured by placing a swab of the discharge on pH paper and comparing the resulting color change with the color swatches on the pH paper container.
3. A positive whiff test; Measured by placing discharge from a swab on a glass slide, then adding a small amount of 10% potassium hydroxide to the discharge. The development of a characteristic fishy odor is considered a positive whiff test.

Some physicians may request wet mount examinations for clue cells, Gram stains, and/or cultures. However, if the above three items are present, a diagnosis of BV can be made without additional laboratory tests. Wet mount examinations for clue cells are not recommended for diagnosis, as interpretation is too subjective.

**Treatment**

Antibiotics are used to treat BV. The antibiotics generally prescribed are metronidazole (Flagyl®) or clindamycin (Cleocin®), taken either orally or vaginally. A seven-day regimen is recommended. There is a high rate of recurrence even with antibiotic compliance. Sexual partners do not require treatment per current recommendations.

**Complications**

BV has been considered a nuisance infection with no serious complications. However, studies have shown that having BV:

- increases a woman’s susceptibility to HIV infection if she is exposed to the HIV virus,
- puts a pregnant woman at increased risk for preterm delivery and a low birth weight baby,
- increases the chances that an HIV-infected woman can pass HIV to her sex partner(s),
- is associated with an increase in the development of infection following surgical procedures such as a hysterectomy, and
- increases a woman’s susceptibility to other STDs.

**Prevention**

While BV is associated with sexual activity, researchers have no clear evidence of sexual transmission. Recommended preventative measures include use of condoms, being monogamous, and cessation of douching.
CHLAMYDIA

General Information

Chlamydia is a sexually transmitted disease caused by the bacteria *Chlamydia trachomatis*. Chlamydia is the most frequently reported STD in the U.S. In 2008, more than 1.2 million chlamydia infections were reported to the CDC from 50 states and the District of Columbia. Most people with chlamydia are unaware they have the disease so this number is not representative of the true number of infected individuals. The U.S. National Health and Nutrition Examination Survey states that closer to 2.3 million individuals in the U.S. are infected with chlamydia.

Symptoms

The majority of infected women have no symptoms. Women who do have symptoms have a vaginal discharge or a burning sensation when urinating. On the other hand, men usually have symptoms of dysuria and a discharge from the penis. Left untreated, chlamydia can progress to serious reproductive and other health problems.

Diagnosis

As chlamydia most often has no warning signs or symptoms in women, it is called a “silent” infection. Screening and early detection of the disease are critical to preventing the long-term effects of the infection.

The specimen of choice for laboratory diagnosis of chlamydia is endocervical swabs for women and intraurethral swabs for men. Urine may also be used for both sexes. The most commonly performed laboratory test for chlamydia is a molecular diagnostic procedure that looks for chlamydia genetic material in the specimen. A positive test indicates an active infection that requires treatment. A negative test only means that there is no current evidence of chlamydia infection.

The CDC recommends yearly chlamydia testing on all sexually active women age 25 or younger; older women who have a new sex partner or multiple sexual partners; and all pregnant women. More frequent screening may be indicated for some women.

Men should be tested for chlamydia whenever symptoms are present. For males who have sex with other males, annual testing is recommended.

Treatment

Chlamydia infections are easily treated and cured with antibiotics. A single dose of azithromycin (Zithromax®) or a week of doxycycline (Adoxa®, Monodox®, Vibramycin®, and more) are the most commonly used antibiotics.

All sex partners of an individual with chlamydia should be appropriately treated. Anyone infected should abstain from sexual intercourse until they and their partners have completed treatment. If not, reinfection is possible.
Complications

Untreated chlamydia infections can progress to serious reproductive and other health problems. In women, untreated infection can spread to the fallopian tubes or uterus and cause pelvic inflammatory disease (PID). PID can cause permanent damage to the fallopian tubes, uterus, and other surrounding tissues. The damage leads to chronic pelvic pain, infertility, and potentially fatal ectopic pregnancy. Each year in the U.S., it is estimated that more than 750,000 women experience an episode of acute PID and more than 75,000 women are diagnosed with infertility as a result of PID. Chlamydia infection also increases the chance of becoming infected with HIV, if exposed.

If a pregnant woman is infected with chlamydia and not treated, the baby can be born premature, and/or have eye and respiratory tract infections.

Prevention

Consistent and correct use of latex condoms for vaginal, anal, and oral sex may be effective in the prevention of chlamydial infections. All sexually active males and females should have periodic screening tests to prevent the spread of infection. All sexual partners of an individual diagnosed with chlamydia should be treated, and abstain from sexual activity until the treatment has been shown to be effective.

Sexual activities should be avoided with partners who have signs or symptoms of STDs.

The surest way to avoid transmission of chlamydia is to abstain from sexual activities, or to maintain a long-term monogamous relationship with an individual who has been tested and known to be uninfected.

GONORRHEA

General Information

Gonorrhea is a STD caused by a bacterium called Neisseria gonorrhoeae. It can infect the urethra, rectum, and throat of both men and women. In women, gonorrhea can also infect the cervix. Pregnant women with gonorrhea can transmit the infection to their babies. In babies, gonorrhea commonly affects the eyes.

A 2009 report from the CDC states that the national gonorrhea rate is at the lowest level ever recorded. However, about 700,000 people contract gonorrhea yearly in the U.S. Only half of this number is actually reported to the CDC, as about 50% of individuals infected with gonorrhea do not have symptoms.

In the U.S., gonorrhea is most prevalent in sexually active teenagers, young adults, and African Americans. Individuals with gonorrhea should be tested for other STDs, especially chlamydia, as the symptoms are very similar.

Symptoms

In women, the symptoms of gonorrhea are often mild or even nonexistent. Symptoms
can be nonspecific and mistaken for a bladder or vaginal infection. Initial symptoms are painful or burning urination, increased vaginal discharge, and/or vaginal bleeding between periods.

Most men have symptoms that appear two to five days after infection. The symptoms are painful, burning urination and a white, yellow, or green discharge from the penis. It is not unusual for an infected man to have painful or swollen testicles.

Symptoms of rectal infections in both men and women include discharge, anal itching, soreness, bleeding, and/or painful bowel movements. Some individuals with rectal infections may have no symptoms.

Individuals with gonorrhea infections of the throat generally have a sore throat and swollen lymph glands. Symptoms of eye infections include pain, discharge, and sensitivity to light.

**Diagnosis**

Gonorrhea is diagnosed with laboratory tests.

1. **Culture and sensitivity:** A swab from the infected area is sent to the laboratory for a culture and sensitivity test. The culture and sensitivity test takes approximately 48 hours. In some circumstances, a culture and sensitivity may be required for selection of the most appropriate antibiotic.

2. **Gonorrhea DNA test:** This test looks for the presence of gonorrhea genetic material in a specimen of the discharge. Urine may also be an acceptable specimen. Results are generally available within 24 hours.

3. **A **Gram stain only of the discharge can be performed but the results of this test are subjective and less reliable than other testing.

**Treatment**

Historically, several antibiotics can successfully cure gonorrhea in adolescents and adults. These antibiotics include penicillin, tetracycline, and ciprofloxacin. However, the development of antibiotic resistance by *Neisseria gonorrhoeae* is a growing public health concern. Currently the CDC recommends use of cephalosporin antibiotics to treat all gonococcal infections.

Babies born to mothers with gonorrhea are treated with antibiotic eye drops soon after birth to prevent infection.

Although antibiotics can cure gonorrhea, it cannot repair any permanent damage done by disease. Individuals can be infected with gonorrhea again, after treatment has ended.

If gonorrhea is suspected but testing has not yet confirmed the infection, individuals should abstain from sexual activities. Once treatment has started, individuals should
continue to avoid sexual intercourse for at least seven days after the start of treatment. All sexual contacts from within the previous 60 days should be tested and treated, if needed.

Complications

Untreated gonorrhea can have serious and permanent health problems in both males and females. In women, gonorrhea is a common cause of pelvic inflammatory disease (PID). As with chlamydia infections, PID can lead to damaged fallopian tubes, infertility, chronic pelvic pain, and increased risk of ectopic pregnancy.

In men, gonorrhea can cause epididymitis, a painful condition of the tubes that connect the testicle to the vas deferens. If untreated, epididymitis can lead to infertility. Gonorrhea infection can spread to the joints and to other areas of the body. Symptoms include fever, rash, skin sores, and pain, swelling, and stiffness of the joints.

Inflammation caused by gonorrhea may make individuals more susceptible to HIV infection, if exposed to the virus.

Untreated eye infections in newborns can lead to blindness.

Prevention

Prevention of gonorrhea is the same as with chlamydia. Consistent and correct use of latex condoms for vaginal, anal, and oral sex may be effective in the prevention of gonorrhea infections. All sexually active males and females should have periodic screening tests to prevent the spread of infection. All sexual partners of an individual diagnosed with chlamydia should be treated and abstain from sexual activity until the treatment has been shown to be effective.

Sexual activities should be avoided with partners who have signs or symptoms of STDs.

The surest way to avoid transmission of gonorrhea is to abstain from sexual activities, or to maintain a long-term monogamous relationship with an individual who has been tested and known to be uninfected.

HEPATITIS B & HEPATITIS C

General Information

Hepatitis B virus (HBV) and hepatitis C virus (HCV) are viruses that infect the liver. HBV and HCV are bloodborne pathogens, i.e., they are spread through contact with blood and body fluids. HBV and HCV can be transmitted through sexual activities with an infected partner, from mother to unborn baby, sharing needles for injection drug use, needlestick/sharps injuries, contact with blood or open sores of an infected person, and sharing items such as razors or toothbrushes with an infected person.

Individuals infected with HBV and HCV may have no symptoms or evidence of liver disease, have an acute infection that lasts up to six months, or may develop chronic
hepatitis, cirrhosis or liver cancer. Infections may cause life-long health issues, including death. Chronic infection with HCV is the most common reason for liver transplants in the U.S. Individuals who are infected but have no symptoms can spread HBV and HCV.

The CDC reports that there were over 4,500 acute cases of hepatitis B in the U.S. in 2007. However, as many individuals do not have symptoms, the actual number may be 10 times higher. The number of acute hepatitis B infections has dramatically dropped since 1991 when new vaccinations schedules for HBV vaccine were released. The CDC also estimates that 800,000 to 1.4 million individuals in the U.S. have chronic hepatitis B.

The CDC estimates that about 17,000 individuals were infected with HCV in 2007. HCV is less common than hepatitis B as a cause of acute infection but is the most common cause of chronic hepatitis. According to the CDC, about 75% - 85% of individuals exposed to HCV will develop chronic hepatitis C infection.

**Symptoms**

Acute HBV/HCV: Many individuals have no symptoms. Others have a flu-like illness. Those who do have symptoms can have fever, fatigue, loss of appetite, nausea, vomiting, abdominal pain, dark urine, clay-colored bowel movements, joint pain, and jaundice.

Chronic HBV/HCV: Individuals may remain asymptomatic for many years. Cirrhosis and fibrosis may develop, leading to scar tissue replacing normal liver tissue. Irreversible liver failure follows. Symptoms result from the liver’s inability to perform its normal functions. Symptoms may include

- abnormal nerve function
- ascites (build-up of fluid in the abdominal cavity)
- breast enlargement in men
- coughing up or vomiting blood
- curling of fingers (Dupuytren’s contracture of the palms)
- gallstones
- hair loss
- itching
- jaundice
- kidney failure
- liver encephalopathy
- muscle loss
- poor appetite
- portal hypertension
- redness of palms
- salivary gland enlargement in cheeks
- shrinking of testes
- small spider-like veins in skin
- weakness
- weight loss

Liver cancer: The majority of patients have no early signs or symptoms until the tumor is quite large. The presence of the cancer interrupts the liver’s ability to perform its normal functions. Symptoms include right upper quadrant pain, weight loss, lack of appetite, abdominal swelling, and jaundice.

**Diagnosis**

Blood tests are performed to diagnose acute and chronic hepatitis infections. The tests look for the presence or absence of HBV and HCV antigens and antibodies, which are sometimes called markers.

By identifying the presence or absence of HBV antigens/antibodies, it can be determined if the individual has an acute infection, chronic infection, or an infection that has resolved itself. Immunity to HBV can also be identified. The hepatitis B virus is complex and has antigens on both the surface and the core of the virus.

**Hepatitis B Virus Tests**

1. The following antigens and antibodies are included in most of the HBV laboratory panels. The following tests are performed on blood specimens.

- Hepatitis B surface antigen (HBsAg)
- Hepatitis B surface antibody (Anti-HBs)
- Hepatitis B core antibody, IgM (Anti-HBc IgM)
- Hepatitis B core antibody, total (Anti-HBc IgG + IgM)
- Hepatitis B e antigen (HBeAg)
- Hepatitis B e antibody (Anti-HBe)

<table>
<thead>
<tr>
<th>HBsAg</th>
<th>Anti-HBs</th>
<th>Anti-HBc IgM</th>
<th>Anti-HBc Total</th>
<th>HBeAg</th>
<th>Anti-HBe</th>
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<td>No active or prior infection</td>
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<td>Positive</td>
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<td>Positive</td>
<td>Negative</td>
<td>Early acute infection</td>
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<td>Negative</td>
<td>Positive or Negative</td>
<td>Positive or Negative</td>
<td>Positive</td>
<td>Negative</td>
<td>Acute infection, usually with symptoms; contagious</td>
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<tr>
<td>Positive</td>
<td>Negative</td>
<td>Positive or Negative</td>
<td>Positive or Negative</td>
<td>Negative</td>
<td>Positive</td>
<td>Late in the acute stage of infection</td>
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<td>Negative</td>
<td>Negative</td>
<td>Positive</td>
<td>Positive</td>
<td>Negative</td>
<td>Positive</td>
<td>Acute infection is resolving</td>
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<td>Positive</td>
<td>Negative</td>
<td>Negative</td>
<td>Positive</td>
<td>Positive</td>
<td>Negative</td>
<td>Active chronic infection; liver damage likely</td>
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<td>Positive</td>
<td>Negative</td>
<td>Negative</td>
<td>Positive</td>
<td>Negative</td>
<td>Positive</td>
<td>Chronic infection but low risk of liver damage; carrier of infection</td>
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<td>Negative</td>
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<td>Negative</td>
<td>Positive</td>
<td>Infection resolved; immunity due to natural infection</td>
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<td>Negative</td>
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<td>Negative</td>
<td>Positive</td>
<td>Negative</td>
<td>Positive</td>
<td>Immunity due to vaccination</td>
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</tbody>
</table>
2. HBV DNA testing: This test identifies and measures the amount of DNA genetic material from the hepatitis B virus in a blood specimen. A high level of HBV DNA means that the virus is multiplying and the individual is contagious. An elevated HBV DNA in an individual who has chronic HBV means that the individual is at increased risk for liver damage.

Measuring HBV DNA is useful in determining the effectiveness of treatment, as the amount of DNA should decrease during successful treatment.

Hepatitis C Virus Tests

1. Anti-HCV antibody: This test looks for the antibody to HCV in the blood. The presence of the antibody indicates that an infection has occurred. It cannot tell the difference between an acute or chronic infection.

2. HCV RNA test: Measuring HCV RNA in blood is useful in determining the effectiveness of treatment, as the amount of RNA should decrease during successful treatment.

TREATMENT

Most people who contract hepatitis B or C are not aware they are infected, or they have mild symptoms similar to those of a mild viral infection. Therefore, treatment is not received. For those individuals who are diagnosed, treatment regimens may vary.

Hepatitis B

There is no cure for hepatitis B infection. When treated, the goal is to reduce the amount of virus in the body and reduce the risk of complications such as cirrhosis, liver failure, and liver cancer.

Acute hepatitis B: Treatment of acute hepatitis B is generally supportive; i.e., rest and management of symptoms. If the acute disease progresses to a more serious illness such as liver failure, or if patients are at high risk for developing chronic hepatitis B, treatment is needed. People at high risk for developing chronic HBV infection include those with one or more of the following.

- Persistently elevated levels of HBV
- Persistently elevated levels of alanine aminotransferase (ALT) and/or elevated alpha-fetoprotein (AFP)
- Coinfection with HCV and/or HIV
- Family history of liver cancer

Treatment of acute HBV infection is usually oral therapy with tenofovir disoproxil (TDF) or entecavir (ETV).

Chronic hepatitis B: Not every person who develops chronic HBV requires treatment. If they have no signs of complications, medications are not used. They are monitored by periodic blood tests for HBV and ALT levels.
When indicated the recommended treatment for chronic hepatitis B disease is pegylated interferon alfa, entecavir, and tenofovir disoproxil fumarate. Those who are successfully treated show decreased liver damage, fibrosis, scarring, and liver failure. The anti-viral drugs can have serious side effects such as hallucinations, delirium, agitation, seizures, difficulty breathing, fever, headache fatigue, arthralgias, and myalgias.

If the first line of treatment drugs is not effective, other treatment options include tenofovir with emtricitabine, lamivudine, telbivudine, and/or adefovir. People can also enter clinical trial studies for new drugs.

**Hepatitis C**

As with hepatitis B, most people who have acute hepatitis C are not treated as they do not know they are infected. They have a mild illness with no symptoms or symptoms similar to many viral illnesses and they recover without any issues.

If a diagnosis of acute or chronic hepatitis C is made, the goal of treatment is to obtain negative blood tests for the presence of HCV in the blood. The disease is considered cured if no virus is detected in the blood for six months after medication has been stopped.

**Acute hepatitis C:** If people are diagnosed with acute HCV, no treatment is usually given for at least 6 months. Their blood levels for liver enzymes (ALT, aspartate aminotransferase [AST]), bilirubin, and prothrombin/INR levels. If these levels do not normalize by six months, treatment should be considered. However, there is controversy among researchers and physicians as to when to begin treatment and how long to treat acute HCV infections.

**Chronic hepatitis C:** Many people live with chronic HCV for years without knowing they have it because they do not have symptoms. When diagnosed, it is not always necessary to be treated. Some people may have little or no liver damage and may choose to monitor liver function for changes before beginning treatment.

**HCV Treatment:** Treatment for HCV is dependent on many factors and it differs from patient to patient. Factors determining the type of treatment include the following.

- The genotype (genetic structure) of the virus
- The viral load (how much virus is present)
- Successfulness of past treatment, if applicable
- Degree of liver damage
- Ability to tolerate the treatment
- Whether the patient has received a liver transplant or is waiting for a liver transplant

The FDA has approved the following drugs to treat HCV infections. They are often used in combinations.
COMPLICATIONS

The most serious complications from HBV and HCV are liver failure requiring liver transplant and liver cancer. Both of these can be life shortening and life threatening events.

PREVENTION

Hepatitis B can be prevented by vaccination. The hepatitis B vaccine is recommended for:

- All infants, beginning at birth
- All children and adolescents who weren't vaccinated at birth
- Anyone being treated for a sexually transmitted disease
- Developmentally disabled people who live in an institutional setting
- Health care workers, emergency workers, and other people who come into contact with blood/body fluids on the job
- HIV-positive people
- Men who have sex with men
- People who have had multiple sexual partners within six months
- People with chronic liver disease
- People who inject illicit drugs
- People who live with someone who has hepatitis B
- People with end-stage kidney disease
- Sexual partners of someone who has hepatitis B
- Travelers planning to go to an area of the world with a high hepatitis B infection rate

There is no vaccine currently available for HCV.

Other ways to minimize transmission of HBV and HCV include the following.

- Do not have unprotected oral, vaginal, or anal sex with individuals who do not know their hepatitis status.
- Use a new latex or polyurethane condom every time for oral, vaginal, and anal sex.
- Stop using illicit injectable drugs. Never share needles.
- Be cautious about body piercing and tattooing.

GENITAL HERPES

General Information

Genital herpes is a STD caused by the herpes simplex virus 1 (HSV-1) or herpes simplex virus 2 (HSV-2). HSV-2 is the cause of most blisters or ulcers on the genitalia. It is spread through sexual contact and skin-to-skin contact. HSV-1 usually causes cold
sores on the lips and in the mouth but it can spread to the genitals via oral sex. HSV-2 can also be the cause of cold sores on the lips and mouth, also spread via oral sex.

HSV-2 is very common and highly infectious. National studies show that 16.2% (or about one out of six) individuals 14-49 years of age have been infected with HSV-2.

HSV-1 and HSV-2 cannot be eliminated from the body. After an initial attack of genital sores, the virus can remain dormant for long periods. The virus can reactivate, causing another outbreak of genital sores. The cycle of dormancy and reactivation can recur for years. Two-thirds of individuals with genital HSV infection have recurrences of their symptoms. One-third of individuals have three or more recurrences per year. For many individuals, however, the outbreaks occur less frequently as time passes. Various factors can trigger outbreaks and these can vary from individual to individual. Triggers can include:

- fatigue,
- surgery,
- illness,
- menstruation,
- stress,
- immune system suppression from chemotherapy, steroid use, or infections such as HIV, and
- genitalia area friction, such as wearing tight clothing.

Most individuals infected with HSV have no signs or symptoms and never know they have been infected. Unfortunately, the viruses can be transmitted even when there are no symptoms or visible sores.

HSV can infect a baby during vaginal birth if the mother is infected with HSV. A caesarian section is recommended for mothers who have a history of genital herpes or an active outbreak at the time of delivery.

**Symptoms**

When signs and symptoms of HSV genital infection are present, they include the following:

- fever, especially during the first outbreak,
- burning or tingling in the genitalia,
- clusters of shallow, small, painful ulcers with a red base in the vaginal area, external genitalia, buttocks, cervix, anus, penis, scrotum, thighs, or inside the urethra,
- enlarged lymph nodes in the groin,
- muscle aches,
- headache, and
- painful urination.

Within a few weeks of exposure to HSV, the genital sores begin to appear. They start out as small red bumps, then they rupture, and become oozing or bleeding ulcers. Scabs eventually form and the ulcers heal. During an outbreak, the genital area with
sores is painful with burning and itching. It may take two to four weeks for the sores to heal themselves.

**Diagnosis**

Often physicians can diagnose HSV infection just by looking at the genital sores. However, to confirm the diagnosis the following laboratory tests may be ordered.

1. **Blood test:** Antibodies to the HSV virus can be found in blood specimens of individuals who have had a past infection of HSV. This test is not helpful in diagnosing a patient having his/her first infection.

2. **Viral culture:** A scraping of the genital sores or secretions from the sores can be submitted for viral tissue culture. This test can take up to 16 hours to 7 days for results to be available.

3. **Polymerase chain reaction (PCR) test:** This test looks for the presence of the HSV genetic material in blood, tissue, or spinal fluid specimens. This is the most accurate of the tests for HSV. Results are generally available within 24 hours.

**Treatment**

There is no cure for genital herpes. Those with mild outbreaks generally do not need treatment. Individuals with severe or prolonged outbreaks can benefit from antiviral drugs such as acyclovir (Zovirax®), famciclovir (Famvir®), and valacyclovir (Valtrex®). Some individuals may choose to take daily antiviral medications to reduce the frequency and severity of recurrences.

Side effects for antiviral drugs for HSV include:

- fatigue,
- headache,
- nausea and vomiting,
- rash,
- seizures, and
- tremor.

**Complications**

In those individuals with a normal functioning immune system, HSV infection is localized in the genital area and is not life threatening. However, HSV infections can be very serious in those who do not have a normal functioning immune system such as newborns, individuals with transplants, chemotherapy patients, and those infected with HIV.

Serious infections include meningitis, encephalitis, and infections of the eyes, esophagus, liver, and lungs. Infected newborns may have severe developmental delays. Death may result from serious HSV infections.
HSV infected individuals are more likely to contact other STD infections that those who are not infected.

**Prevention**

Suggestions for preventing HSV infection are the same as for other sexually transmitted diseases.

- Use latex condoms during oral, vaginal, and anal sexual intercourse.
- Avoid sexual contact with individuals with genital or oral herpes infections.
- Limit the number of sexual contacts.

Individuals with active HSV lesions should avoid contact with newborns and other immunosuppressed people.

There is currently no FDA-approved vaccine for HSV prevention.

**HUMAN IMMUNODEFICIENCY VIRUS**

**General Information**

The human immunodeficiency virus (HIV) is a virus that infects cells in the body's immune system. If not treated, the immune system becomes damaged and is unable to protect the individual from infections and certain cancers. If an individual gets two or more of these opportunistic infections or certain cancers, he/she has Acquired Immunodeficiency Syndrome or AIDS. There is no cure for HIV infection, but thanks to HIV medications and aggressive treatments, individuals with HIV are living long productive lives.

The CDC estimates that there are more than one million people in the U.S. living with HIV. One in five (21%) of these individuals are unaware they are infected. An estimated 56,300 U.S. individuals become infected with HIV each year. CDC believes this is far too high a level, given the knowledge of methods of HIV prevention.

More than 18,000 individuals with AIDS still die each year in the U.S. The majority of persons who have died of AIDS in the U.S. are men who have had sex with men (MSM).

**Transmission of HIV**

As with HBV and HCV, HIV is a bloodborne pathogen. It can be transmitted through sexual activities with an infected partner, from mother to unborn baby, sharing needles for injection drug use, needlestick/sharps injuries, contact with blood or open sores of an infected person, and sharing items such as razors or toothbrushes with an infected person. The only body fluids not associated with HIV transmission are saliva, tears, and sweat. However, if saliva is contaminated with blood from oral sores or bleeding gums, HIV can be transmitted.
Infections in HIV Positive Individuals

A normal healthy immune system is constantly exposed to common bacteria, protozoal parasites, fungi, and viruses. The immune system kills these microorganisms so that infection does not occur. However, if the HIV virus has sufficiently damaged the immune system of an infected individual, the immune system cannot fight the microorganisms and infections can occur. These infections are known as opportunistic infections.

HIV positive individuals can also develop overwhelming and life threatening infections from microorganisms that cause no symptoms or only minor problems in individuals with normal immune systems.

Some of the common infections seen in HIV positive individuals include the following.

- Thrush: yeast infection of the mouth, throat, or vagina; caused by *Candida albicans*
- Cytomegalovirus (CMV): viral infection of the eye that can lead to blindness
- Herpes simplex viruses (HSV): viral infection that normally causes cold sores of the mouth and genital herpes; outbreaks in HIV positive individuals are more widespread, frequent, and severe
- Tuberculosis: bacterial infection of the lungs; caused by *Mycobacterium tuberculosis*; in HIV positive individuals can cause meningitis
- Pneumocystis: fungal infection that can result in fatal pneumonia; caused by *Pneumocystis jiroveci*
- Toxoplasmosis: protozoal infection of the brain; caused by *Toxoplasma gondii*
- *Mycobacterium avium* complex: bacterial infection that causes problems with digestion and serious weight loss; caused by *Mycobacterium avium* and *Mycobacterium intracellulare*

Cancer in HIV Positive Individuals

As the immune system of HIV-infected individuals becomes compromised, the individuals become susceptible to the formation of certain types of cancer. These include Kaposi’s sarcoma, invasive cervical cancer, and lymphomas.

Kaposi’s sarcoma is a tumor of the blood vessel walls. It presents itself as pink, red, or purple lesions of the skin and mouth. It can also affect internal organs including the digestive tract and lungs.

Invasive cervical cancer is the most severe stage of cervical cancer. It is associated with human papilloma virus (HPV) infection in HIV-positive women.

Lymphomas are cancer of the lymphocyte cells that generally begins in the lymph nodes. The most common early sign is painless swelling of the lymph nodes in the neck, armpit, or groin.

Symptoms

Symptoms of HIV infection can be described in three possible stages.
Initial Infection

In the first few weeks after infection, some individuals have few or no symptoms. Others may have flu-like symptoms. If an individual does have symptoms from the initial infection, they can include the following:

- fever,
- headache,
- sore throat
- rash, and
- swollen lymph nodes.

Years Later

Individuals who have not been successfully treated, eventually develop mild infections or chronic symptoms as a result of the viral destruction of the immune system. These can include:

- fever,
- weight loss,
- diarrhea,
- swollen lymph nodes,
- cough, and
- shortness of breath.

Progression to AIDS

If no treatment is received, or if treatment is unsuccessful, HIV infection almost always progresses to AIDS in about 10 years. The immune system becomes severely damaged. AIDS patients may show the following signs and symptoms in addition to the specific symptoms of any opportunistic infections they have.

- Night sweats
- Shaking chills and fever
- Cough and shortness of breath
- Chronic diarrhea
- Persistent white spots or lesions on the tongue or in the mouth
- Headaches
- Persistent, unexplained fatigue
- Blurred and distorted vision
- Severe weight loss
- Skin rashes
- Brain deterioration
- Development of Kaposi’s sarcoma, invasive cervical cancer, or lymphoma

Death eventually results from overwhelming infection or cancer.
Diagnosis

As with many other laboratory viral tests, there are two tests to detect HIV infection: one laboratory test that detects HIV antibodies and one that detects HIV genetic material.

1. HIV Antibody Tests

These are the most commonly used HIV tests. Blood specimens are collected and tested for the presence or absence of antibodies to HIV. Most individuals will develop antibodies within 2-8 weeks after exposure to HIV. However, it can take up to six months to detect HIV antibodies after the initial infection. The period between exposure and antibody development is called the “window period.” Individuals are infectious during the window period.

If a basic laboratory HIV antibody test is positive, it must be confirmed by a more sophisticated laboratory test called a Western blot test.

2. HIV PCR Tests

Polymerase chain reaction (PCR) tests detect the genetic material specific for HIV in the blood specimen, as well as the amount of the virus. This test is sometimes called a viral load study. A PCR test can be used to detect HIV exposure in the window period when no antibody has yet been produced or as a test to monitor the effectiveness of treatment. If the viral load quantity decreases, the treatment is effective.

Treatment

There is no cure for HIV infection. However, there are drugs that can be used in combination to control the multiplication of the virus with hope to prevent the development of AIDS. These drugs work to prevent HIV from infecting immune cells, or to disable the multiplication of HIV inside the immune cells. Some of the drugs include efavirenz (Sustiva®), lamivudine and zidovudine (Combivir®), fosamprenavir (Lexiva®), and enfuvirtide (Fuzeon®).

Treatment of HIV positive individuals involves taking many pills at specific times every day. Side effects can include nausea, vomiting, diarrhea, abnormal heartbeats, shortness of breath, rash, weakened bones, and bone death.

If an HIV infection proceeds to AIDS, then treatment of the opportunistic infections and/or cancer is added to the HIV treatment.

Complications

The complication of HIV infection is the development of AIDS. Death can result from the opportunistic infections and/or cancer.

Prevention

There is no vaccine for HIV. Prevention of HIV transmission is the same as for other STDs.
Do not have unprotected oral, vaginal, or anal sex with individuals who do not know their HIV status.
Use a new latex or polyurethane condom every time for oral, vaginal, and anal sex.
Stop using illicit injectable drugs. Never share needles.
Be cautious about body piercing and tattooing.
Be tested for HIV on a regular basis if involved in risky behaviors.
If pregnant, get treated right away to prevent transmission to the baby.

HUMAN PAPILLOMA VIRUS

Human papillomavirus (HPV) is a group of more than 100 different types of viruses that cause papillomas (warts), genital warts, oral cancer, and cancer of the genitalia.

More than 30 types of HPV are transmitted through vaginal, anal, and oral sex. Most individuals infected with sexually transmitted HPV will not have any symptoms. However, some sexually transmitted HPV infections may cause oral cancer, cancer of the cervix, vulva, vagina, anus, or penis.

Studies report that approximately 20 million people in the U.S. are currently infected with sexually transmitted HPV and more than 6 million people are diagnosed each year. Data estimates that 70% of women are exposed to the virus sometime during their lives and over 50% of sexually active men in the United States will have HPV at some time in their lives. Not everyone will show signs and symptoms of disease and HPV can unknowingly be transmitted to sex partners.

According to a study reported in the February 2007 issue of the Journal of the American Medical Association, about 14,000 women in the U.S. are diagnosed with cervical cancer each year, and more than 3,900 women die each year from the disease. The report also states that there is a 24.5% prevalence of HPV among females 14-19 years old and a 44.8% prevalence of HPV among females 20-24 years old.

While uncommon, anal and penile cancer in men has also been associated with HPV infection. The American Cancer Society (ACS) estimates that annually 1,500 men will be diagnosed with penile cancer and 1,900 with anal cancer in the U.S. It is estimated that approximately 980 men will die each year from these two types of cancer.

Recently, HPV infections have been implicated in various types of oral cancer. This includes cancer of the following structures.

- Lips
- Gums
- Tongue
- Lining of the cheeks
- Salivary glands
- Floor of your mouth (area under the tongue)
- Roof of your mouth (hard palate)
- Soft palate
Symptoms

Signs and symptoms of HPV infection may include any or all of the following:

- soft, skin-colored or red, painless, cauliflower-like warts located in or around the genitalia,
- genital sores located in or around the genitalia or anus,
- increased moisture in the area of the warts,
- chronic itching in or around the genitalia or anus,
- increased vaginal discharge,
- abnormal vaginal/penile/anal discharge or bleeding,
- sores in the mouth, and/or
- abnormal cells found on Pap smear.

Diagnosis

Genital warts

Genital warts are generally diagnosed by a visual inspection. The healthcare provider may use a magnifying lens to identify small warts. Some healthcare providers may choose to wash the genital area with acetic acid (vinegar). This causes the warts to turn white, making them more easily seen. However, this procedure is not specific for genital warts as normal bumps and tissue may also turn white.

Biopsies are usually not necessary to diagnose genital warts but one may be performed if the suspected wart is discolored or unusual looking. There are no blood tests currently available to diagnose an individual for HPV.

HPV Related Cancer

Women

HPV cervical infection is typically detected with a Pap smear that demonstrates abnormal changes in the cells of the cervix. Cervical cells infected with HPV show characteristic features when stained and observed microscopically.

As a Pap smear is not 100% sensitive or specific for the detection of HPV related cancer, additional tests are required to confirm a HPV infection. For the confirmatory test, cells are scraped from the cervix, and tested with a HPV DNA test. This test can confirm the presence of HPV and identify the high risk HPV types associated with the development of cervical cancer.

If an HPV infection persists in cervical cells, the Pap smear abnormalities may become more severe, indicating the presence of either pre-cancer or cancer. Pap smear changes are graded on a specific scale and the higher the grade, the more serious the disease.
**Men**

There are no currently available tests used for early detection of HPV related cancer in men. Biopsies of abnormal areas of the penis, scrotum, or anus can be obtained for microscopic evaluation. Some medical experts recommend that men who are at increased risk for anal cancer have routine Pap tests on cells scraped from the anus to identify the presence of abnormal cells. At this time, however, the Centers for Disease Control and Prevention (CDC) do not recommend routine anal cancer screening.

**Treatment**

**Genital warts**

Genital warts may go away without treatment, stay unchanged, or increase in size and number. The primary goal of treating genital warts is cosmetic. Many treatments are available for genital warts and evidence does not indicate that one treatment is better than another. Treatments include the following.

- Antiviral creams
- Chemical treatment (usually with acids)
- Surgical excision (removal)
- Freezing with liquid nitrogen
- Laser treatment
- Antiviral therapy, e.g. interferon

Problems with treatments can include abdominal cramping, pelvic discomfort, foul smelling vaginal discharge, bleeding, allergic reactions, inflammation of the cervical tissue, and raw or painful skin reactions. Unfortunately, HPV still lives in the cells of the individual even after these procedures, but with any of these treatments, the recurrence of outbreaks generally becomes less common.

**HPV Related Cancer**

**Cervix**

The treatment options for cervical cancer depend primarily on how advanced the cancer is, i.e., the stage of the cancer. Surgical treatments are listed below. The treatment options become more extensive as the severity of the cancer increases. The treatment options are listed from the least severity to highest severity of cancer diagnosis.

- Cryosurgery (least extensive): cervical cancer cells are killed by freezing
- Laser surgery: laser beam is used to burn off cervical cancer cells
- Cone biopsy: removal of a cone-shaped piece of cervical tissue (can be used to remove cancerous tissue, as well as for a biopsy for diagnosis)
- Simple hysterectomy: the uterus only is removed
- Radical hysterectomy and pelvic lymph node dissection: the uterus, vagina, fallopian tubes, ovaries, and pelvic lymph nodes are removed
- Pelvic exenteration (most extensive): a radical hysterectomy is performed and the bladder, rectum, and portions of the colon are removed
Depending on the severity of the cancer, radiation therapy and/or chemotherapy may be given prior to or after surgery.

**Penis**

Early stages of penile cancer can be treated by surgical removal of the cancerous lesion and use of a chemotherapy cream such as 5-FU. Mohs surgery (microscopically guided removal of only the cancerous layers of skin) and laser surgery are generally the surgical techniques of choice. Radiation therapy is recommended for early stages of penile cancer.

As the stages of penile cancer become more advanced, more extensive surgery is required. The surgery may include partial or complete removal of the penis, testicles, scrotum, and pelvic lymph nodes. The effectiveness of using chemotherapy or chemotherapy with radiation therapy in the advanced stages of penile cancer is under investigation.

**Anus**

Early stages of anal cancer can be treated by surgical removal of the cancerous lesion. If the removal of the lesion involves the rectal sphincter, radiation and chemotherapy are recommended. If cancer remains after radiation and chemotherapy, surgery that is more radical may be needed. It may become necessary to remove pelvic lymph nodes and portions of the colon. If significant amounts of the colon are removed, a colostomy will be required.

**Complications**

Complications related to HPV infection are those as described in the previous section relating to the development and treatment of cancer.

Inflammation caused by HPV may make individuals more susceptible to HIV infection, if exposed to the virus.

**Prevention**

Two vaccines are available that can protect both males and females against the most common types of HPV. To be most effective, the vaccines should be given before the individual’s first sexual contact.

- Girls and women: Two FDA-approved vaccines, Gardasil® and Cervarix®, are available that protect against the types of HPV that cause most cervical cancer. Gardasil® also protects against most genital warts. Both vaccines are recommended for 11 and 12-year-old-girls and for females 13–26 years, if they did not get the vaccine at a younger age.
- Boys and men: Gardasil® is recommended to protect males against genital warts. It is FDA-approved for boys and men, ages 9-26 years.

Women can protect themselves by having routine cervical cancer screening and follow-up of abnormal results. If cervical cancer is detected and treated early, the prognosis is greatly improved. The screening tests include a Pap smear and the HPV DNA test.
Additional recommendations for HPV prevention are the same as for other STDs: use a condom for oral, vaginal, and anal sexual intercourse; limit the number of sexual partners; and avoid sexual contacts with genital warts and/or other STDs.

SYPHILIS

General Information

Syphilis is a sexually transmitted disease caused by the bacteria *Treponema pallidum*. The disease starts out as a painless sore, usually on the genitals, rectum, or mouth. Syphilis is spread from person to person via skin or mucous membrane contact with the sores during vaginal, anal, and oral sex. It can also be transmitted from mother to baby during pregnancy or childbirth (congenital syphilis). About 12% of babies with congenital syphilis die from the disease. Without successful treatment, syphilis can severely damage the heart, brain, and other organs.

In a report released by the CDC in 2014, a total of 19,999 cases of primary and secondary syphilis were reported in the United States, a 15.1% increase when compared to 2013, and a 40.0% increase when compared to 2010.

Between 2012 and 2014, syphilis cases in women increased 22%, resulting in a 38% increase in the number of newborns with congenital syphilis. About ¼ of these women had no prenatal care, and many who did have prenatal care were not even tested for syphilis. Of those who were tested positive for syphilis, almost half were not treated.

Since 2000, the largest increases in syphilis have been among men who have sex with men (MSM) (62% increase) and young black men (58% increase). The data also shows that regardless of race or gender, sexually active adolescents, and young adults are at increased risk for syphilis when compared to older adults.

Symptoms

Syphilis develops in stages and the symptoms vary with each stage. Not everyone has every symptom and stages may overlap. The goal of treatment is to stop the syphilis infection in the primary stage (Stage 1) or secondary stage (Stage 2) before permanent damage occurs.

Stage 1: Primary Syphilis

The first sign of syphilis is a small painless sore called a chancre. It appears about three weeks after exposure. Chancre can occur on the external genitalia, vagina, anus, and in the rectum or mouth. The chancre occurs where the bacteria entered the body. Most infected individuals have only one chancre. The chancre will heal itself in about six weeks. Some individuals may not know they are infected as the chancre is usually painless and it may be hidden within the vagina or rectum. Individuals in the primary stage of syphilis are infectious and can spread the disease to others through sexual activity.
Stage 2: Secondary Syphilis

Syphilis progresses to the secondary stage if it is not successfully treated in the primary stage. The symptoms of secondary syphilis appear within a few weeks of the chancre healing. The symptoms are a non-itchy generalized skin rash and lesions called condyloma latum. Condyloma latum appear as slightly raised, or flat, round or oval papules covered by gray exudate. These lesions involve mainly the warm, moist areas such as the perineum and perianal skin. The rash appears even on the soles of the feet and palms of the hands. Some individuals also have muscle aches, weight loss, fatigue, fever, sore throat, and swollen lymph nodes. These symptoms may disappear within a few weeks or repeatedly come and go for as long as a year. Individuals in the second stage of syphilis are infectious and can spread the disease to others through sexual activity.

Stage 3: Latent Syphilis

Syphilis progresses to the latent stage if it is not successfully treated in the primary or secondary stages. The latent stage begins when the secondary stage ends. Symptoms disappear and infected individuals are no longer infectious. However, the individual still is infected with syphilis. This stage can last for as long as 20 years. For some people, this is the last stage of syphilis. About 15% of individuals with latent syphilis, will enter the tertiary or late stage.

Stage 4: Tertiary or Late Syphilis

In the late stage of syphilis, the disease begins to damage internal organs, including the brain, nerves, eyes, heart, blood vessels, liver, bones, and joints. Signs and symptoms of late stage syphilis include uncoordinated muscle movements, numbness, paralysis, gradual blindness, and dementia. Death may result from late stage syphilis.

Diagnosis

Syphilis diagnosis differs depending on the stage of the infection.

Primary and Secondary Syphilis

1. Dark field microscopy: As soon as a chancre is present, material from it can be viewed for the presence of the *T. pallidum* bacteria. This examination is done using a special type of microscope called a dark field microscope. The bacteria appear as white spiral shapes on a dark background.

2. Blood test for antibodies: Within one week of the development of a chancre, infected individuals will have antibodies to the *T. pallidum* bacteria. There are two types of antibody tests: non-treponemal and treponemal. Non-treponemal tests are used first and if positive, they must be confirmed with a treponemal antibody test. Non-treponemal tests include the rapid plasma reagin (RPR) and the Venereal Disease Research Laboratory (VDRL) test. Treponemal antibody tests include the fluorescent antibody test (FTA-ABS) and the *T. pallidum* hemagglutination (TPHA) test.

**Latent Syphilis**: Blood tests for antibodies will be positive in this stage of syphilis.
**Tertiary or Late Stage Syphilis:** Blood tests for antibodies will be positive in this stage of syphilis. A diagnosis of tertiary syphilis can be made by testing the cerebrospinal fluid for *T. pallidum* antibodies using the VDRL test. Individuals with tertiary syphilis will have *T. pallidum* antibodies in their cerebrospinal fluid.

**Treatment**

Syphilis is easy to cure in the primary and secondary stages. It cannot be cured in the latent or tertiary stages. The preferred treatment for all stages is penicillin. For those individuals who are allergic to penicillin, doxycycline, tetracycline, ceftriaxone, and azithromycin can be used in all stages except tertiary syphilis. Tertiary syphilis can be treated with penicillin. However, at this stage the antibiotic only minimizes the symptoms; it does not cure the infection. If these patients are allergic to penicillin, an allergy desensitization procedure is required before treatment is initiated.

Newborn children of mothers with syphilis should be treated with penicillin, even if the mother has herself been treated.

**Complications**

Without successful treatment in the primary and secondary stages, syphilis can cause serious irreversible damage to the body. Serious neurological problems like stroke, meningitis, deafness, visual problems, and dementia can result. Cardiovascular problems such as aneurysms and inflammation of the aorta can result. Death can also occur.

Untreated congenital syphilis can lead to miscarriage, stillbirth, or death of the newborn. Untreated newborns can become deaf, have seizures, have developmental delay, and have "saddle" nose, where the bridge of the nose collapses. Untreated newborns may also die.

Inflammation caused by syphilis may make individuals more susceptible to HIV infection, if exposed to the virus.

**Prevention**

Recommended general methods for syphilis prevention are the same as for other STDs: use a condom for oral, vaginal, and anal sexual intercourse; limit the number of sexual partners; and avoid sexual contacts with syphilis or other STDs.

In addition, individuals who participate in risky sexual behaviors should be tested for syphilis at least yearly.

**TRICHOMEONIASIS**

**General Information**

Trichomoniasis is a common STD that affects both men and women. The disease is caused by a single-celled protozoan parasite, *Trichomonas vaginalis*. The vagina is the most common site of infection in women, and the urethra is the most common site of
infection in men. The parasite is transmitted via vaginal intercourse or vulva-to-vulva contact with an infected partner. Women can acquire the disease from both men and women. Men usually contract trichomoniasis from an infected woman.

Trichomoniasis is the most common curable STD in young, sexually active women. An estimated 7.4 million new cases of trichomoniasis occur each year in men and women.

Symptoms

Some women may not have any signs or symptoms of trichomoniasis. When present, symptoms usually appear within five to 28 days of exposure. Symptomatic women may have:

- frothy, greenish-yellow vaginal discharge with a strong odor,
- painful urination,
- vaginal itching and irritation,
- discomfort during vaginal intercourse, and rarely,
- lower abdominal pain.

Men most often do not have symptoms and do not know they are infected until their partners are diagnosed. When symptoms occur, they include:

- irritation in the urethra,
- mild discharge, and
- slight burning after urination and ejaculation.

Diagnosis

Diagnosis is made by seeing the parasite in vaginal discharge or urethral fluid (men). The test is called a wet mount examination. The discharge or fluid is mixed with a small quantity of normal saline, and reviewed microscopically for the presence of the parasite. The trichomonas parasite can sometimes be found in microscopic examination of urine sediment, if the urine becomes contaminated with vaginal discharge.

Treatment

Trichomoniasis is treated with Flagyl® (metronidazole). It is important that all sexual partners be treated even if they are asymptomatic. If sexual partners are not treated, the infection will continue to be passed back and forth. Sexual activity should be avoided during the antibiotic treatment and until symptoms are gone.

Complications

Inflammation caused by trichomoniasis may make women more susceptible to HIV infection, if exposed to the virus.
Prevention
Recommended general methods for trichomoniasis prevention are the same as for other STDs: use a condom for sexual intercourse; limit the number of sexual partners; and avoid sexual contacts with STDs.

COMPARISON OF GENITAL LESIONS

The following table describes the genital lesions discussed in this CE course.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Characteristics of genital lesion</th>
<th>Causative Agent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary syphilis: chancre</td>
<td>Usually solitary, painless ulcer with indurated border</td>
<td>Treponema pallidum</td>
</tr>
<tr>
<td>Secondary syphilis: condyloma latum</td>
<td>Slightly raised or flat, round or oval papules covered by gray exudate</td>
<td>Treponema pallidum</td>
</tr>
<tr>
<td>Genital herpes</td>
<td>Cluster of shallow, small, painful ulcers on a red base</td>
<td>Herpes simplex virus (HSV)</td>
</tr>
<tr>
<td>Genital warts</td>
<td>Soft, usually painless skin-colored or red cauliflower-like papules</td>
<td>Human papillomavirus (HPV)</td>
</tr>
</tbody>
</table>

OTHER SEXUALLY TRANSMITTED DISEASES

There are more than 30 different STDs transmitted by bacteria, viruses, and parasites. The following table summarizes other STDs seen in the U.S.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Symptoms</th>
<th>Causative Agent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chancroid</td>
<td>Large painful blister or ulcer in the genital area; can rupture and ooze</td>
<td>Haemophilus ducreyi (bacteria)</td>
</tr>
<tr>
<td>Granuloma Inguinale</td>
<td>Painless ulcers in the genital area which enlarge and bleed</td>
<td>Klebsiella granulomatis (bacteria)</td>
</tr>
<tr>
<td>Molluscum contagiosum</td>
<td>Smooth, shiny lesions in the genital area</td>
<td>Molluscum contagiosum virus</td>
</tr>
<tr>
<td>Mucopurulent cervicitis</td>
<td>Discharge from cervix similar to that seen in chlamydia and gonorrhea infections</td>
<td>Unknown, sometimes called non-chlamydial non-gonococcal cervicitis</td>
</tr>
</tbody>
</table>

CONCLUSION

In the U.S., STDs represent a major public health challenge. If not diagnosed and treated early, many STDs can cause serious health issues, such as infertility, cancer, organ damage, and even death. STDs caused by bacteria and parasites can be cured with antibiotics or other medications. However, there is no cure for STDs caused by viruses. Fortunately, there are vaccines for two viral STDs, hepatitis B, and human papilloma virus. These vaccines should provide immunity and prevent infection upon exposure. The goal of medications used for viral STDs is to keep the disease under control.

Often individuals infected with STDs do not have symptoms. However, they are still infectious and can transmit the infection to sexual partners. The good news is three-fold.
1. Using safe sex practices can help prevent transmission of STDs.

2. Being tested for STDs on a regular basis can detect infections early so they can be treated before serious complications occur.

3. Receiving vaccinations on the schedule recommended by CDC can prevent two viral STDs, HBV and HPV.

REFERENCES


TEST QUESTIONS
Sexually Transmitted Diseases #1222318

Directions:
- Answer sheets: Read the instructions to assure you correctly complete the answer sheets.
  - NOTE: If the online test questions differ from the course test that follows the reading material, the CE course you are using is outdated or the question has been revised since you downloaded it. The online question is the most current and it should be answered accordingly.
- Select the response that best completes each sentence or answers each question from the information presented in the course.
- If you are having difficulty answering a question, go to www.ncctinc.com and select Forms/Documents. Then select CE Updates and Revisions to see if course content and/or a test questions have been revised. If you do not have access to the internet, call Customer Service at 800-875-4404.
1. Approximately how many STD infections are reported each year in the U.S.?
   a. 5 million
   b. 9 million
   c. 19 million
   d. 29 million

2. Which of the following STDs has the symptom of an off-white vaginal discharge with an unpleasant smell?
   a. Bacterial vaginosis
   b. Chlamydia
   c. HIV
   d. Trichomoniasis

3. Which of the following bacteria is associated with bacterial vaginosis?
   a. *Escherichia coli*
   b. *Gardnerella vaginalis*
   c. *Lactobacillus* spp.
   d. *Neisseria gonorrhoea*

4. Untreated chlamydia infections can progress to __________.
   a. cervical cancer
   b. gonorrhea
   c. pelvic inflammatory disease
   d. renal failure

5. The symptoms of a gonorrheal infection are similar to the symptoms of a/an __________ infection.
   a. chlamydia
   b. HBV
   c. HPV
   d. syphilis

6. Currently the CDC recommends which of the following types of antibiotics for treatment of gonorrhea?
   a. Cephalosporins
   b. Penicillins
   c. Tetracyclines
   d. Sulfonamides

7. Complications of gonorrhea infections include __________.
   a. epididymitis
   b. joint pain, swelling, stiffness
   c. PID
   d. All of the above
8. While HBV and HCV are sexually transmitted diseases, they are more commonly known as __________ pathogens.
   a. airborne
   b. bloodborne
   c. contact
   d. waterborne

9. HBV and HCV infect the __________.
   a. genitalia
   b. kidney
   c. liver
   d. urinary tract

10. Which of the following are methods by which HBV and HCV can be spread to others?
    a. Mother to unborn baby
    b. Sexual activities
    c. Sharing razors or toothbrushes
    d. All of the above

11. Which of the following is a TRUE statement about HSV infections?
    a. HSV-2 usually causes cold sores on the mouth and lips.
    b. HSV-1 usually causes blisters or ulcers on the genitalia.
    c. HSV-1 and HSV-2 can reactivate after periods of dormancy.
    d. HSV-2 is not a very common infection.

12. Which of the following best describes the appearance of HSV genital sores?
    a. Cluster of shallow, small, painful ulcers on a red base
    b. Slightly raised or flat, round, or oval papules covered by a gray exudate
    c. Solitary, painless ulcer with indurated border
    d. Soft, usually painless, skin-colored or red papules with a cauliflower-like appearance

13. HSV infections can be very serious in which of the following patient populations?
    a. Chemotherapy patients
    b. HIV positive patients
    c. Transplant patients
    d. All of the above
14. The HIV virus infects the cells of the __________ system.
   a. immune
   b. reproductory
   c. respiratory
   d. endocrine

15. Which of the following is a type of cancer that is known to afflict patients with AIDS?
   a. Colon cancer
   b. Kaposi's sarcoma
   c. Melanoma
   d. Myelogenous leukemia

16. Which of the following laboratory tests for HIV is often called a “viral load” study?
   a. HIV antibody test
   b. PCR test
   c. Viral culture
   d. Western blot test

17. Human papilloma virus (HPV) can cause __________.
   a. cervical cancer
   b. genital warts
   c. oral cancer
   d. All of the above

18. Which of the following best describes the appearance of HPV genital warts?
   a. Cluster of shallow, small, painful ulcers on a red base
   b. Slightly raised or flat, round, or oval papules covered by a gray exudate
   c. Solitary, painless ulcer with indurated border
   d. Soft, usually painless, skin-colored or red papules with a cauliflower-like appearance

19. As Pap smears cannot detect HPV infection 100% of the time, which of the following tests is needed to confirm an HPV infection?
   a. Culture and sensitivity
   b. HPV DNA test
   c. HPV antibody test
   d. All of the above
20. Which of the following best describes the appearance of a primary syphilis chancre?
   a. Cluster of shallow, small, painful ulcers on a red base
   b. Slightly raised or flat, round, or oval papules covered by a gray exudate
   c. Solitary, painless ulcer with indurated border
   d. Soft, usually painless, skin-colored or red papules with a cauliflower-like appearance

21. In which stage of syphilis can the disease NOT be cured?
   a. Primary
   b. Secondary
   c. Tertiary
   d. Syphilis can be cured in all stages

22. Untreated syphilis can lead to __________.
   a. cardiovascular problems
   b. dementia
   c. death
   d. All of the above

23. Trichomoniasis is transmitted by a __________ named *Trichomonas vaginalis*.
   a. bacteria
   b. fungus
   c. parasite
   d. virus

24. The vaginal discharge in a woman infected with *T. vaginalis* is described as a __________.
   a. greenish, yellow, or white in copious quantities
   b. thick, white, and chunky
   c. thin, homogenous, off white with an fishy odor
   d. frothy, greenish-yellow with a strong odor

25. Which of the following are recommended methods for the prevention of sexually transmitted diseases?
   a. Avoid anal, oral, and vaginal sexual intercourse with anyone with a STD.
   b. Limit the number of sexual contacts.
   c. Use a condom for anal, oral, and vaginal sexual intercourse.
   d. All of the above are recommended.

*End of Test*
P.A.C.E.® Course Evaluation

Directions: Please let us know whether this CE Course met your expectations by answering the following questions. Your feedback helps us to make our products better for you!

Course Title: Sexually Transmitted Diseases  
Course Number: 1222318

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<th>OBJECTIVES</th>
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<td>___Yes ___No</td>
<td><strong>1.</strong> Did you meet the objectives while reading this CE course?</td>
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<td><strong>2.</strong> Did the test measure what you learned?</td>
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<td>___Yes ___No</td>
<td><strong>3.</strong> Were you satisfied with this course?</td>
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<td><strong>4.</strong> Was the CE course organized and useful for learning?</td>
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<td><strong>5.</strong> Was this CE course written at the right level for the practicing professional?</td>
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<td>___Yes ___No</td>
<td><strong>6.</strong> Did you learn anything new?</td>
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<td>___Yes ___No ___Maybe</td>
<td><strong>7.</strong> Did you learn anything you might use at work?</td>
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What can NCCT do to make the CE courses better for you?

What would you like to learn about in the future? Please list *specific* topics!

*Please include this evaluation with your answer sheet.*