Additional Information for Teachers
Center for Disease Control and Prevention Information

Lyme Disease

- Prevention:
  - Avoid Areas With a Lot of Ticks
    - Ticks prefer wooded and bushy areas with high grass
    - Take extra precautions in May, June, and July. This is when ticks that transmit Lyme disease are most active.
    - If you do enter a tick area, walk in the center of the trail to avoid contact with overgrown grass, brush, and leaf litter.
    - Ask your local health department and park or extension service about tick-infested areas to avoid.

  - Keep Ticks off Your Skin
    - Use insect repellent with 20% - 30% DEET on adult skin and clothing to prevent tick bite. Effective repellents are found in drug, grocery and discount stores.
    - Wear long pants, long sleeves, and long socks to keep ticks off your skin. Light-colored clothing will help you spot ticks more easily. Tucking pant legs into socks or boots and tucking shirts into pants help keep ticks on the outside of clothing. If you'll be outside for an extended period of time, tape the area where your pants and socks meet to prevent ticks from crawling under your clothes.

  - Check Your Skin and Clothes for Ticks Every Day
    - Remove ticks from your clothes before going indoors. To kill ticks that you may have missed, wash your clothes with hot water and dry them using high heat for at least one hour.
    - Perform daily tick checks after being outdoors, even in your own yard. Inspect all parts of your body carefully including your armpits, scalp, and groin. Remove ticks immediately using fine-tipped tweezers.
    - If a tick is attached to your skin for less than 24 hours, your chance of getting Lyme disease is extremely small. But just to be safe, monitor your health closely after a tick bite and be alert for any signs and symptoms of tick-borne illness.
- Transmission
  - Ticks Transmit Lyme Disease
    - The Lyme disease bacterium, *Borrelia burgdorferi*, normally lives in mice, squirrels and other small animals. It is transmitted among these animals – and to humans -- through the bites of certain species of ticks.
    - In the northeastern and north-central United States, the blacklegged tick (or deer tick, *Ixodes scapularis*) transmits Lyme disease. In the Pacific coastal United States, the disease is spread by the western blacklegged tick (*Ixodes pacificus*). Other tick species found in the United States have not been shown to transmit *Borrelia burgdorferi*. Blacklegged ticks live for two years and have three feeding stages: larvae, nymph, and adult. When a

young tick feeds on an infected animal, the tick takes the bacterium into its body along with the blood meal.
- The bacterium then lives in the gut of the tick. If the tick feeds again, it can transmit the bacterium to its new host. Usually the new host is another small rodent, but sometimes the new host is a human.
- Most cases of human illness occur in the late spring and summer when the tiny nymphs are most active and human outdoor activity is greatest.
- Although adult ticks often feed on deer, these animals do not become infected. Deer are nevertheless important in transporting ticks and maintaining tick populations.

- Other Modes of Transmission

  - Person-to-Person
    - There is no evidence that Lyme disease is transmitted from person-to-person. For example, a person cannot get infected from touching, kissing or having sex with a person who has Lyme disease.

  - During Pregnancy & While Breastfeeding
    - Lyme disease acquired during pregnancy may lead to infection of the placenta and possible stillbirth, however, no negative effects on the fetus have been found when the mother receives appropriate antibiotic treatment. There are no reports of Lyme disease transmission from breast milk.

  - From Blood
    - Although no cases of Lyme disease have been linked to blood transfusion, scientists have found that the Lyme disease bacteria can live in blood that is stored for donation. As a precaution, the American Red Cross and the US Food and Drug Administration ask that persons with chronic illness due to Lyme disease do not donate blood. Lyme disease patients who have been treated with antibiotics and have recovered can donate blood beginning 12 months after the last dose of antibiotics was taken.

  - From Pets
    - Although dogs and cats can get Lyme disease, there is no evidence that they spread the disease directly to their owners. However, pets can bring infected ticks into your home or yard. Consider protecting your pet, and possibly yourself, through the use of tick control products for animals.

  - Other Transmission
    - You will not get Lyme disease from eating venison or squirrel meat, but in keeping with general food safety principles meat

should always be cooked thoroughly. Note that hunting and dressing deer or squirrels may bring you into close contact with infected ticks.

- There is no credible evidence that Lyme disease can be transmitted through air, food, water, or from the bites of mosquitoes, flies, fleas, or lice.

- Diagnosis
  - Lyme disease is diagnosed based on symptoms, objective physical findings (such as erythema migrans, facial palsy, or arthritis), and a history of possible exposure to infected ticks. Validated laboratory tests can be very helpful but are not generally recommended when a patient has erythema migrans (bulls eye rash).

  - When making a diagnosis of Lyme disease, health care providers should consider other diseases that may cause similar illness. Not all patients with Lyme disease will develop the characteristic bulls-eye rash, and many may not recall a tick bite. Laboratory testing is not recommended for persons who do not have symptoms of Lyme disease.

  - Laboratory Testing

    - Several forms of laboratory testing for Lyme disease are available, some of which have not been adequately validated. Most recommended tests are blood tests that measure antibodies made in response to the infection. These tests may be falsely negative in patients with early disease, but they are quite reliable for diagnosing later stages of disease.

    - CDC recommends a two-step process when testing blood for evidence of Lyme disease. Both steps can be done using the same blood sample.

    - The first step uses an ELISA or IFA test. These tests are designed to be very "sensitive," meaning that almost everyone with Lyme disease, and some people who don't have Lyme disease, will test positive. If the ELISA or IFA is negative, it is highly unlikely that the person has Lyme disease, and no further testing is recommended. If the ELISA or IFA is positive or indeterminate (sometimes called "equivocal"), a second step should be performed to confirm the results.

    - The second step uses a Western blot test. Used appropriately, this test is designed to be "specific," meaning that it will usually be positive only if a person has been truly infected. If the Western blot is negative, it suggests that the first test was a false positive, which can occur for several reasons. Sometimes two types of Western blot are performed, "IgM" and "IgG." Patients who are positive by IgM but not IgG should have the test repeated a few weeks later if they remain ill. If they are still positive only by IgM and have been ill longer than one month, this is likely a false positive.

- CDC does not recommend testing blood by Western blot without first testing it by ELISA or IFA. Doing so increases the potential for false positive results. Such results may lead to patients being treated for Lyme disease when they don't have it and not getting appropriate treatment for the true cause of their illness.

- Other Types of Laboratory Testing
  - Some laboratories offer Lyme disease testing using assays whose accuracy and clinical usefulness have not been adequately established. These tests include urine antigen tests, immunofluorescent staining for cell wall-deficient forms of *Borrelia burgdorferi*, and lymphocyte transformation tests. In general, CDC does not recommend these tests. Patients are encouraged to ask their physicians whether their testing for Lyme disease was performed using validated methods and whether results were interpreted using appropriate guidelines.

- Testing Ticks
  - Patients who have removed a tick often wonder if they should have it tested. In general, the identification and testing of individual ticks is not useful for deciding if a person should get antibiotics following a tick bite. Nevertheless, some state or local health departments offer tick identification and testing as a community service or for research purposes. Check with your health department; the phone number is usually found in the government pages of the telephone book.

- Treatment
  - The National Institutes of Health (NIH) has funded several studies on the treatment of Lyme disease. These studies have shown that most patients can be cured with a few weeks of antibiotics taken by mouth. Antibiotics commonly used for oral treatment include doxycycline, amoxicillin, or cefuroxime axetil. Patients with certain neurological or cardiac forms of illness may require intravenous treatment with drugs such as ceftriaxone or penicillin.

  - Patients treated with antibiotics in the early stages of the infection usually recover rapidly and completely. A few patients, particularly those diagnosed with later stages of disease, may have persistent or recurrent symptoms. These patients may benefit from a second 4-week course of therapy. Longer courses of antibiotic treatment have not been shown to be beneficial and have been linked to serious complications, including death.

  - Studies of women infected during pregnancy have found that there are no negative effects on the fetus if the mother receives appropriate antibiotic treatment for her Lyme disease. In general, treatment for pregnant women is similar to that for non-pregnant persons, although certain antibiotics are not used because they may affect the fetus. If in doubt, discuss treatment options with your health care provider.

Strep Throat

- What is group A streptococcus (GAS)?

Group A streptococcus is a bacterium often found in the throat and on the skin. People may carry group A streptococci in the throat or on the skin and have no symptoms of illness. Most GAS infections are relatively mild illnesses such as "strep throat," or impetigo. On rare occasions, these bacteria can cause other severe and even life-threatening diseases

- How are group A streptococci spread?

These bacteria are spread through direct contact with mucus from the nose or throat of persons who are infected or through contact with infected wounds or sores on the skin. Ill persons, such as those who have strep throat or skin infections, are most likely to spread the infection. Persons who carry the bacteria but have no symptoms are much less contagious. Treating an infected person with an antibiotic for 24 hours or longer generally eliminates their ability to spread the bacteria. However, it is important to complete the entire course of antibiotics as prescribed. It is not likely that household items like plates, cups, or toys spread these bacteria.

- What kinds of illnesses are caused by group A streptococcal infection?

Infection with GAS can result in a range of symptoms:

No illness
Mild illness (strep throat or a skin infection such as impetigo)
Severe illness (necrotizing faciitis, streptococcal toxic shock syndrome)

Severe, sometimes life-threatening, GAS disease may occur when bacteria get into parts of the body where bacteria usually are not found, such as the blood, muscle, or the lungs. These infections are termed "invasive GAS disease." Two of the most severe, but least common, forms of invasive GAS disease are necrotizing fasciitis and Streptococcal Toxic Shock Syndrome. Necrotizing fasciitis (occasionally described by the media as "the flesh-eating bacteria") destroys muscles, fat, and skin tissue. Streptococcal toxic shock syndrome (STSS), causes blood pressure to drop rapidly and organs (e.g., kidney, liver, lungs) to fail. STSS is not the same as the "toxic shock syndrome" frequently associated with tampon usage. About 20% of patients with necrotizing fasciitis and more than half with STSS die. About 10%-15% of patients with other forms of invasive group A streptococcal disease die.

- How common is invasive group A streptococcal disease?

About 9,400 cases of invasive GAS disease occurred in the United States in 1999. Of these, about 300 were STSS and 600 were necrotizing fasciitis. In contrast, there are several million cases of strep throat and impetigo each year.

- Why does invasive group A streptococcal disease occur?

Invasive GAS infections occur when the bacteria get past the defenses of the person who is infected. This may occur when a person has sores or other breaks in the skin that allow the bacteria to get into the tissue, or when the person's ability to fight off the infection is decreased because of chronic illness or an illness that affects the immune system. Also, some virulent strains of GAS are more likely to cause severe disease than others.

- Who is most at risk of getting invasive group A streptococcal disease?

Few people who come in contact with GAS will develop invasive GAS disease. Most people will have a throat or skin infection, and some may have no symptoms at all. Although healthy people can get invasive GAS disease, people with chronic illnesses like cancer, diabetes, and kidney dialysis, and those who use medications such as steroids have a higher risk.

- What are the early signs and symptoms of necrotizing fasciitis and streptococcal toxic shock syndrome?

Early signs and symptoms of necrotizing fasciitis;

- Fever
- Severe pain and swelling
- Redness at the wound site

Early signs and symptoms of STSS;

- Fever
- Dizziness
- Confusion
- A flat red rash over large areas of the body

- How is invasive group A streptococcal disease treated?

GAS infections can be treated with many different antibiotics. Early treatment may reduce the risk of death from invasive group A streptococcal disease. However, even the best medical care does not prevent death in every case. For those with very severe illness, supportive care in an intensive care unit may be needed. For persons with necrotizing fasciitis, surgery often is needed to remove damaged tissue.

- What can be done to help prevent group A streptococcal infections?

The spread of all types of GAS infection can be reduced by good hand washing, especially after coughing and sneezing and before preparing foods or eating. Persons with sore throats should be seen by a doctor who can perform tests to find out whether the illness is strep throat. If the test result shows strep throat, the person should stay home from work, school, or day care until 24 hours after taking an antibiotic. All wounds should be kept clean and watched for possible signs of infection such as redness, swelling, drainage, and pain at the wound site. A person with signs of an infected wound, especially if fever occurs, should seek medical care. It is not necessary for all persons exposed to someone with an invasive group A strep infection (i.e. necrotizing fasciitis or strep toxic shock syndrome) to receive antibiotic therapy to prevent infection. However, in

certain circumstances, antibiotic therapy may be appropriate. That decision should be made after consulting with your doctor.

Tuberculosis

- What is TB?
    - Tuberculosis (TB) is a disease caused by bacteria called Mycobacterium tuberculosis. The bacteria usually attack the lungs. But, TB bacteria can attack any part of the body such as the kidney, spine, and brain. If not treated properly, TB disease can be fatal. TB disease was once the leading cause of death in the United States.
    - TB is spread through the air from one person to another. The bacteria are put into the air when a person with active TB disease of the lungs or throat coughs or sneezes. People nearby may breathe in these bacteria and become infected.
    - However, not everyone infected with TB bacteria becomes sick. People who are not sick have what is called latent TB infection. People who have latent TB infection do not feel sick, do not have any symptoms, and cannot spread TB to others. But, some people with latent TB infection go on to get TB disease.
    - People with active TB disease can be treated and cured if they seek medical help. Even better, people with latent TB infection can take medicine so that they will not develop active TB disease.
- Why is TB a problem today?
    - Starting in the 1940s, scientists discovered the first of several medicines now used to treat TB. As a result, TB slowly began to decrease in the United States. But in the 1970s and early 1980s, the country let its guard down and TB control efforts were neglected. As a result, between 1985 and 1992, the number of TB cases increased. However, with increased funding and attention to the TB problem, we have had a steady decline in the number of persons with TB since 1992. But TB is still a problem; more than 14,000 cases were reported in 2003 in the United States.
    - This booklet answers common questions about TB. Please ask your doctor or nurse if you have other questions about latent TB infection or TB disease.
- How is TB spread?
    - TB is spread through the air from one person to another. The bacteria are put into the air when a person with active TB disease of the lungs or throat coughs or sneezes. People nearby may breathe in these bacteria and become infected.
    - When a person breathes in TB bacteria, the bacteria can settle in the lungs and begin to grow. From there, they can move through the blood to other parts of the body, such as the kidney, spine, and brain.

- TB in the lungs or throat can be infectious. This means that the bacteria can be spread to other people. TB in other parts of the body, such as the kidney or spine, is usually not infectious.

- People with active TB disease are most likely to spread it to people they spend time with every day. This includes family members, friends, and coworkers.

- What is latent TB infection?

  - In most people who breathe in TB bacteria and become infected, the body is able to fight the bacteria to stop them from growing. The bacteria become inactive, but they remain alive in the body and can become active later. This is called latent TB infection. People with latent TB infection

    - have no symptoms
    - don't feel sick
    - can't spread TB to others
    - usually have a positive skin test reaction
    - can develop active TB disease if they do not receive treatment for latent TB infection

  - Many people who have latent TB infection never develop active TB disease. In these people, the TB bacteria remain inactive for a lifetime without causing disease. But in other people, especially people who have weak immune systems, the bacteria become active and cause TB disease.

- What is active TB disease?

  - TB bacteria become active if the immune system can't stop them from growing. The active bacteria begin to multiply in the body and cause active TB disease. The bacteria attack the body and destroy tissue. If this occurs in the lungs, the bacteria can actually create a hole in the lung. Some people develop active TB disease soon after becoming infected, before their immune system can fight the TB bacteria. Other people may get sick later, when their immune system becomes weak for another reason.

  - Babies and young children often have weak immune systems. People infected with HIV, the virus that causes AIDS, have very weak immune systems. Other people can have weak immune systems, too, especially people with any of these conditions:

    - substance abuse
    - diabetes mellitus
    - silicosis
    - cancer of the head or neck
    - leukemia or Hodgkin's disease
    - severe kidney disease
    - low body weight
    - certain medical treatments (such as corticosteroid treatment or organ transplants)

- specialized treatment for rheumatoid arthritis or Crohn's disease

- Symptoms of TB depend on where in the body the TB bacteria are growing. TB bacteria usually grow in the lungs. TB in the lungs may cause symptoms such as

  - a bad cough that lasts 3 weeks or longer
  - pain in the chest
  - coughing up blood or sputum (phlegm from deep inside the lungs)

- Other symptoms of active TB disease are

  - weakness or fatigue
  - weight loss
  - no appetite
  - chills
  - fever
  - sweating at night

- The Difference Between Latent TB Infection and Active TB Disease

1) A Person with Latent TB Infection
   - Has no symptoms
   - Does not feel sick
   - Cannot spread TB to others
   - Usually has a positive skin test or QuantiFERON-TB® Gold test
   - Has a normal chest x-ray and sputum test

2) A Person with Active TB Disease
   - Has symptoms that may include:
     - a bad cough that lasts 3 weeks or longer
     - pain in the chest
     - coughing up blood or sputum
     - weakness or fatigue
     - weight loss
     - no appetite
     - chills
     - fever
     - sweating at night
   - May spread TB to others
   - Usually has a positive skin test or QuantiFERON®-TB Gold test
   - May have an abnormal chest x-ray, or positive sputum smear or culture

Influenza

- What is Influenza (also called Flu)?

The flu is a contagious respiratory illness caused by influenza viruses. It can cause mild to severe illness, and at times can lead to death. The best way to prevent this illness is by getting a flu vaccination each fall.

- Every year in the United States, on average:
    - 5% to 20% of the population gets the flu;
    - more than 200,000 people are hospitalized from flu complications, and;
    - about 36,000 people die from flu.

- Some people, such as older people, young children, and people with certain health conditions, are at high risk for serious flu complications.

- Symptoms of Flu
    - fever (usually high)
    - headache
    - extreme tiredness
    - dry cough
    - sore throat
    - runny or stuffy nose
    - muscle aches
    - Stomach symptoms, such as nausea, vomiting, and diarrhea, also can occur but are more common in children than adults

- Complications of Flu

Complications of flu can include bacterial pneumonia, dehydration, and worsening of chronic medical conditions, such as congestive heart failure, asthma, or diabetes. Children may get sinus problems and ear infections.

- How Flu Spreads

Flu viruses spread in respiratory droplets caused by coughing and sneezing. They usually spread from person to person, though sometimes people become infected by touching something with flu viruses on it and then touching their mouth or nose. Most healthy adults may be able to infect others beginning 1 day before symptoms develop and up to 5 days after becoming sick. That means that you can pass on the flu to someone else before you know you are sick, as well as while you are sick.

- Preventing the Flu: Get Vaccinated

- The single best way to prevent the flu is to get a flu vaccination each fall. There are two types of vaccines:

- The "flu shot" – an inactivated vaccine (containing killed virus) that is given with a needle. The flu shot is approved for use in people older than 6 months, including healthy people and people with chronic medical conditions.

- The nasal-spray flu vaccine – a vaccine made with live, weakened flu viruses that do not cause the flu (sometimes called LAIV for "Live Attenuated Influenza Vaccine"). LAIV is approved for use in healthy people 5 years to 49 years of age who are not pregnant.

- About two weeks after vaccination, antibodies develop that protect against influenza virus infection. Flu vaccines will not protect against influenza-like illnesses caused by other viruses.

- When to Get Vaccinated

October or November is the best time to get vaccinated, but getting vaccinated in December or even later can still be beneficial. Flu season can begin as early as October and last as late as May.

- Who Should Get Vaccinated?

In general, anyone who wants to reduce their chances of getting the flu can get vaccinated. However, certain people should get vaccinated each year. They are either people who are at high risk of having serious flu complications or people who live with or care for those at high risk for serious complications. People who should get vaccinated each year are:

- People at high risk for complications from the flu:

    - People 65 years and older;
    - People who live in nursing homes and other long-term care facilities that house those with long-term illnesses;
    - Adults and children 6 months and older with chronic heart or lung conditions, including asthma;
    - Adults and children 6 months and older who needed regular medical care or were in a hospital during the previous year because of a metabolic disease (like diabetes), chronic kidney disease, or weakened immune system (including immune system problems caused by medicines or by infection with human immunodeficiency virus [HIV/AIDS]);
    - Children 6 months to 18 years of age who are on long-term aspirin therapy. (Children given aspirin while they have influenza are at risk of Reye syndrome.);
    - Women who will be pregnant during the influenza season;
    - All children 6 to 23 months of age;
    - People with any condition that can compromise respiratory function or the handling of respiratory secretions (that is, a condition that makes it hard to breathe

or swallow, such as brain injury or disease, spinal cord injuries, seizure disorders, or other nerve or muscle disorders.)

- People 50 to 64 years of age. Because nearly one-third of people 50 to 64 years of age in the United States have one or more medical conditions that place them at increased risk for serious flu complications, vaccination is recommended for all persons aged 50 to 64.

- People who can transmit flu to others at high risk for complications. Any person in close contact with someone in a high-risk group (see above) should get vaccinated. This includes all health-care workers, household contacts and out-of-home caregivers of children 6 to 23 months of age, and close contacts of people 65 years and older.

- Who Should Not Be Vaccinated

  - Some people should not be vaccinated without first consulting a physician. They include:

    - People who have a severe allergy to chicken eggs.
    - People who have had a severe reaction to an influenza vaccination in the past.
    - People who developed Guillain-Barré syndrome (GBS) within 6 weeks of getting an influenza vaccine previously.
    - Children less than 6 months of age (influenza vaccine is not approved for use in this age group).
    - People who have a moderate or severe illness with a fever should wait to get vaccinated until their symptoms lessen.

  - If you have questions about whether you should get a flu vaccine, consult your health-care provider.

HIV/AIDS

How HIV is Transmitted

- HIV is spread by sexual contact with an infected person, by sharing needles and/or syringes (primarily for drug injection) with someone who is infected, or, less commonly (and now very rarely in countries where blood is screened for HIV antibodies), through transfusions of infected blood or blood clotting factors. Babies born to HIV-infected women may become infected before or during birth or through breast-feeding after birth.
- In the health care setting, workers have been infected with HIV after being stuck with needles containing HIV-infected blood or, less frequently, after infected blood gets into a worker's open cut or a mucous membrane (for example, the eyes or inside of the nose). There has been only one instance of patients being infected by a health care worker in the United States; this involved HIV transmission from one infected dentist to six patients. Investigations have been completed involving more than 22,000 patients of 63 HIV-infected physicians, surgeons, and dentists, and no other cases of this type of transmission have been identified in the United States.
- Some people fear that HIV might be transmitted in other ways; however, no scientific evidence to support any of these fears has been found. If HIV were being transmitted through other routes (such as through air, water, or insects), the pattern of reported AIDS cases would be much different from what has been observed. For example, if mosquitoes could transmit HIV infection, many more young children and preadolescents would have been diagnosed with AIDS.
- All reported cases suggesting new or potentially unknown routes of transmission are thoroughly investigated by state and local health departments with the assistance, guidance, and laboratory support from CDC. No additional routes of transmission have been recorded despite a national sentinel system designed to detect just such an occurrence. The following paragraphs specifically address some of the common misperceptions about HIV transmission.

HIV in the Environment

- Scientists and medical authorities agree that HIV does not survive well in the environment, making the possibility of environmental transmission remote. HIV is found in varying concentrations or amounts in blood, semen, vaginal fluid, breast milk, saliva, and tears. To obtain data on the survival of HIV, laboratory studies have required the use of artificially high concentrations of laboratory-grown virus. Although these unnatural concentrations of HIV can be kept alive for days or even weeks under precisely controlled and limited laboratory conditions, CDC studies have shown that drying of even these high concentrations of HIV reduces the amount of infectious virus by 90 to 99 percent within several hours. Since the HIV concentrations used in laboratory studies are much higher than those actually found in blood or other specimens, drying of HIV-infected human blood or other body fluids reduces the theoretical risk of environmental transmission to that which has been observed--essentially zero. Incorrect interpretation of conclusions drawn from laboratory studies have unnecessarily alarmed some people.
- Results from laboratory studies should not be used to assess specific personal risk of infection because (1) the amount of virus studied is not found in human specimens or elsewhere in nature, and (2) no one has been identified as infected with HIV due to contact with an environmental surface. Additionally, HIV is unable to reproduce outside its living host (unlike many bacteria or fungi, which may do so under suitable conditions), except under laboratory conditions, therefore, it does not spread or maintain infectiousness outside its host.

Households

- Although HIV has been transmitted between family members in a household setting, this type of transmission is very rare. These transmissions are believed to have resulted from contact between skin or mucous membranes and infected blood. To prevent even such rare occurrences, precautions, as described in previously published guidelines, should be taken in all settings "including the home" to prevent exposures to the blood of persons who are HIV infected, at risk for HIV infection, or whose infection and risk status are unknown. For example,
    - Gloves should be worn during contact with blood or other body fluids that could possibly contain visible blood, such as urine, feces, or vomit.

- Cuts, sores, or breaks on both the care giver's and patient's exposed skin should be covered with bandages.
- Hands and other parts of the body should be washed immediately after contact with blood or other body fluids, and surfaces soiled with blood should be disinfected appropriately.
- Practices that increase the likelihood of blood contact, such as sharing of razors and toothbrushes, should be avoided.
- Needles and other sharp instruments should be used only when medically necessary and handled according to recommendations for health-care settings. (Do not put caps back on needles by hand or remove needles from syringes. Dispose of needles in puncture-proof containers)

Businesses and Other Settings

- There is no known risk of HIV transmission to co-workers, clients, or consumers from contact in industries such as food-service establishments (see information on survival of HIV in the environment). Food-service workers known to be infected with HIV need not be restricted from work unless they have other infections or illnesses (such as diarrhea or hepatitis A) for which any food-service worker, regardless of HIV infection status, should be restricted. CDC recommends that all food-service workers follow recommended standards and practices of good personal hygiene and food sanitation.
- In 1985, CDC issued routine precautions that all personal-service workers (such as hairdressers, barbers, cosmetologists, and massage therapists) should follow, even though there is no evidence of transmission from a personal-service worker to a client or vice versa. Instruments that are intended to penetrate the skin (such as tattooing and acupuncture needles, ear piercing devices) should be used once and disposed of or thoroughly cleaned and sterilized. Instruments not intended to penetrate the skin but which may become contaminated with blood (for example, razors) should be used for only one client and disposed of or thoroughly cleaned and disinfected after each use. Personal-service workers can use the same cleaning procedures that are recommended for health care institutions.
- CDC knows of no instances of HIV transmission through tattooing or body piercing, although hepatitis B virus has been transmitted during some of these practices. One case

of HIV transmission from acupuncture has been documented. Body piercing (other than ear piercing) is relatively new in the United States, and the medical complications for body piercing appear to be greater than for tattoos. Healing of piercings generally will take weeks, and sometimes even months, and the pierced tissue could conceivably be abraded (torn or cut) or inflamed even after healing. Therefore, a theoretical HIV transmission risk does exist if the unhealed or abraded tissues come into contact with an infected personï¿_s blood or other infectious body fluid. Additionally, HIV could be transmitted if instruments contaminated with blood are not sterilized or disinfected between clients.

Kissing

- Casual contact through closed-mouth or "social" kissing is not a risk for transmission of HIV. Because of the potential for contact with blood during "French" or open-mouth kissing, CDC recommends against engaging in this activity with a person known to be infected. However, the risk of acquiring HIV during open-mouth kissing is believed to be very low. CDC has investigated only one case of HIV infection that may be attributed to contact with blood during open-mouth kissing.

Biting

- In 1997, CDC published findings from a state health department investigation of an incident that suggested blood-to-blood transmission of HIV by a human bite. There have been other reports in the medical literature in which HIV appeared to have been transmitted by a bite. Severe trauma with extensive tissue tearing and damage and presence of blood were reported in each of these instances. Biting is not a common way of transmitting HIV. In fact, there are numerous reports of bites that did /not/ result in HIV infection.

Saliva, Tears, and Sweat

- HIV has been found in saliva and tears in very low quantities from some AIDS patients. It is important to understand that finding a small amount of HIV in a body fluid does not necessarily mean that HIV can be /transmitted/ by that body fluid. HIV has /not/ been recovered from the sweat of HIV-infected persons. Contact with saliva, tears, or sweat has never been shown to result in transmission of HIV.

Insects

- From the onset of the HIV epidemic, there has been concern about transmission of the virus by biting and bloodsucking insects. However, studies conducted by researchers at CDC and elsewhere have shown no evidence of HIV transmission through insects--even in areas where there are many cases of AIDS and large populations of insects such as mosquitoes. Lack of such outbreaks, despite intense efforts to detect them, supports the conclusion that HIV is not transmitted by insects.
- The results of experiments and observations of insect biting behavior indicate that when an insect bites a person, it does not inject its own or a previously bitten person's or animal's blood into the next person bitten. Rather, it injects saliva, which acts as a lubricant or anticoagulant so the insect can feed efficiently. Such diseases as yellow fever and malaria are transmitted through the saliva of specific species of mosquitoes. However, HIV lives for only a short time inside an insect and, unlike organisms that are transmitted via insect bites, HIV does not reproduce (and does not survive) in insects. Thus, even if the virus enters a mosquito or another sucking or biting insect, the insect does not become infected and cannot transmit HIV to the next human it feeds on or bites. HIV is not found in insect feces.
- There is also no reason to fear that a biting or bloodsucking insect, such as a mosquito, could transmit HIV from one person to another through HIV-infected blood left on its mouth parts. Two factors serve to explain why this is so--first, infected people do not have constant, high levels of HIV in their bloodstreams and, second, insect mouth parts do not retain large amounts of blood on their surfaces. Further, scientists who study insects have determined that biting insects normally do not travel from one person to the next immediately after ingesting blood. Rather, they fly to a resting place to digest this blood meal.

Effectiveness of Condoms

- Condoms are classified as medical devices and are regulated by the Food and Drug Administration (FDA). Condom manufacturers in the United States test each latex condom for defects, including holes, before it is packaged. The proper and consistent use of latex or polyurethane (a type of plastic) condoms when engaging in sexual intercourse--vaginal, anal, or oral--can greatly reduce a person's risk of acquiring or transmitting sexually transmitted diseases, including HIV infection.

- There are many different types and brands of condoms available--however, only latex or polyurethane condoms provide a highly effective mechanical barrier to HIV. In laboratories, viruses occasionally have been shown to pass through natural membrane ("skin" or lambskin) condoms, which may contain natural pores and are therefore not recommended for disease prevention (they are documented to be effective for contraception). Women may wish to consider using the female condom when a male condom cannot be used.
- For condoms to provide maximum protection, they must be used consistently (every time) and correctly. Several studies of correct and consistent condom use clearly show that latex condom breakage rates in this country are less than 2 percent. Even when condoms do break, one study showed that more than half of such breaks occurred prior to ejaculation.
- When condoms are used reliably, they have been shown to prevent pregnancy up to 98 percent of the time among couples using them as their only method of contraception. Similarly, numerous studies among sexually active people have demonstrated that a properly used latex condom provides a high degree of protection against a variety of sexually transmitted diseases, including HIV infection.

Chickenpox

1. What is varicella (chickenpox)?

Chickenpox is an infectious disease caused by the varicella-zoster virus, which results in a blister-like rash, itching, tiredness and fever. The rash appears first on the trunk and face, but can spread over the entire body causing between 250 to 500 itchy blisters. Most cases of chickenpox occur in persons less than 15 years old. Prior to the use of varicella vaccine, the disease had annual cycles, peaking in the spring of each year.

2. How do you get chickenpox?

Chickenpox is highly infectious and spreads from person to person by direct contact or through the air from an infected person's coughing or sneezing. A person with chickenpox is contagious 1-2 days before the rash appears and until all blisters have formed scabs. It takes from 10-21 days after contact with an infected person for someone to develop chickenpox.

3. What is the chickenpox illness like?

In children, chickenpox most commonly causes an illness that lasts about 5-10 days. Children usually miss 5 or 6 days of school or childcare due to their chickenpox. About half of all children with chickenpox visit a health care provider due to symptoms of their illness such as high fever, severe itching, an uncomfortable rash, dehydration or headache. In addition, about 1 child in 10 has a complication from chickenpox serious enough to visit a health care provider including infected skin lesions, other infections, dehydration from vomiting or diarrhea, exacerbation of asthma or more serious complications such as pneumonia.

Certain groups of persons are more likely to have more serious illness with complications. These include adults, infants, adolescents and people with weak immune systems from either illnesses or from medications such a long-term steroids.

4. What are the serious complications from chickenpox?

Serious complications from chickenpox include bacterial infections, which can involve many sites of the body including the skin, tissues under the skin, bone, lungs (pneumonia), joints and the blood. Other serious complications are due directly to the virus infection and include viral pneumonia, bleeding problems and infection of the brain (encephalitis). Many people are not aware that, before a vaccine was available, there were approximately 11,000 hospitalizations and 100 deaths from chickenpox in the U.S. every year . One child and one adult died each week.

5. *Can a healthy person with varicella die from the disease?

Yes, many of the deaths and complications from chickenpox occur in previously healthy children and adults. From 1990 to 1994, before there was a vaccine available, there were about 50 chickenpox deaths in children and 50 chickenpox deaths in adults every year; most of these persons were healthy or did not have a medical illness (such as cancer) that placed them at higher risk of getting severe chickenpox. Since 1999, states have been encouraged to report chickenpox deaths to CDC. In 1999 and 2000, CDC received reports that showed that deaths from chickenpox continue to occur in healthy, unvaccinated children and adults. Most of the healthy adults who died from chickenpox contracted the disease from their unvaccinated children.

6. Can chickenpox be prevented?

Yes, chickenpox can now be prevented by vaccination.

7. Can you get chickenpox more than once?

Yes, but it is uncommon to do so. For most people, one infection is thought to confer lifelong immunity.

8. Chickenpox in children is usually not serious. Why not let children get the disease?

It is never possible to predict who will have a mild case of chickenpox and who will have a serious or even deadly case of disease. Now that there is a safe and effective vaccine available, it is not worth taking this chance.

Additional Information for Teachers
Center for Disease Control and Prevention Information

Infectious Diseases and Modes of Transmission

Infectious Disease	**Microbe**	**Transmission Method**
Lyme disease	Bacteria, *Borrelia burgdorferi*	Deer tick to person, Deer tick bite, hosts can be deer or other woodland mammals
Strep Throat	Bacteria, *Streptococcus pyogenes*	Person to person, Large respiratory droplets or direct contact with carriers, Rarely indirect contact from objects or casual contact
Tuberculosis	Bacteria, *Myobacterium tuberculosis*	Person to person, Exposure to airborne droplets inhaled from a carrier's sneeze or cough
Influenza	Virus, Influenza virus	Person to person, Direct contact or airborne spread, virus may persist in rooms for hours
HIV/AIDS	Virus, HIV	Person to person through blood and/or bodily fluids
Chickenpox	Virus, Varicella-Zoster virus	Person to person by direct contact, droplet or airborne spread by carriers

What is Public Health?
Association of Schools of Public Health (http://www.whatispublichealth.org)

The mission of public health is to "fulfill society's interest in assuring conditions in which people can be healthy." (Institute of Medicine, Committee for the Study of the Future of Public Health, Division of Health Care Services. 1988. The Future of Public Health. National Academy Press, Washington, DC)

Public health carries out its mission through organized, interdisciplinary efforts that address the physical, mental and environmental health concerns of communities and populations at risk for disease and injury. Its mission is achieved through the application of health promotion and disease prevention technologies and interventions designed to improve and enhance quality of life. Health promotion and disease prevention technologies encompass a broad array of functions and expertise, including the three core public health functions:

* assessment and monitoring of the health of communities and populations at risk to identify health problems and priorities;

* formulating public policies, in collaboration with community and government leaders, designed to solve identified local and national health problems and priorities;

* assuring that all populations have access to appropriate and cost-effective care, including health promotion and disease prevention services, and evaluation of the effectiveness of that care

The Ten Essential Public Health Services

* Monitor health status to identify community health problems
* Diagnose and investigate health problems and health hazards in the community
* Inform, educate, and empower people about health issues
* Mobilize community partnerships to identify and solve health problems
* Develop policies and plans that support individual and community health efforts
* Enforce laws and regulations that protect health and ensure safety
* Link people to needed personal health services and assure the provision of health care when otherwise unavailable
* Assure a competent public health and personal health care workforce
* Evaluate effectiveness, accessibility, and quality of personal and population-based health services
* Research for new insights and innovative solutions to health problems

Careers in Public Health
Association of Schools of Public Health (www.asph.org)

Public health careers offer something for everyone. Epidemiology and biostatistics involve mathematics and modeling. Environmental health includes a wide range of science skills. Health administration and community health sciences are careers which involve being with people. Health education is a teacher's field. Health policy includes a political componant.

Perhaps never has there been a more exciting time to pursue a career in public health. Why? Because....

Most experts agree that major advances in improvement of health over the next decades will not come from new medical findings or cures, but rather the broader development and application of population-based prevention programs.
Health services delivery systems are undergoing rapid change. Greater emphasis is being placed on health promotion and disease prevention as a means to reduce the costs of care by improving the health of our populations. These changes have created a broad array of new opportunities for professionals with advanced training in public health.
As the public has become better informed about the effects of toxic wastes and pollutants on their health, greater emphasis is being placed on assuring the safety of our communities as well as worker health and safety. As a result, there is growing demand for experts in environmental health and industrial hygiene.
Public health research is focusing more on women's health, and child and substance abuse, and an increased emphasis is being placed on behavioral change to prevent the risk of STDs, HIV/AIDS, tuberculosis, and unplanned pregnancies. Greater emphasis is also being placed on school health and the health of minority and disadvantaged populations.

The following are a few examples of employers and job titles in public health:

Biostatistics

State Health Department
Data Management Director
Industry/Corporate
Director of Clinical Trials
Federal Government
Program Evaluation Analyst

Epidemiology
Local/State Health Department
Director of Infectious/Chronic Diseases
Industry/Corporate
Outcomes Researcher
Federal Government
CDC Investigator

Health Services Administration
Health Facilities
Hospital/Managed Care Administrator
State Health Dept
Program Evaluation & Planning
Industry/Corporate
Information Systems Manager
University
Health Services Research Analyst
Federal Government
Policy Analyst

Health Education/Behavioral Science
Voluntary Health Agencies
Consumer Information Director
Local Health Department
Program Planning & Evaluation
Industry/Corporate
Health Promotion Specialist

Environmental Health
Local Health Department/Environmental Agency
Waste Management Specialist
State Health Department/Environmental Agency
Pollution Control Program Director
Industry/Corporate
Industrial Hygienist
Federal Government
EPA Researcher/Administrator

For more information, contact ASPH at
(202) 296-1099 or visit our website at www.asph.org.

Original URL: http://www.asph.org/document.cfm?page=728
Posted on: 03/30/2003
Last Updated on: 07/06/2004