The purpose of this supplement is to give CAL FIRE employees an abbreviated explanation of the processes that take place when a human being is exposed to, and possibly contracts, an infectious disease. It primarily deals with diseases that can be caused by exposures which occur in the work environment. It is meant to serve as a guide in the recognition and prevention of occupational infections.

To be able to identify a potential exposure, the infectious agent and the five components of the chain of transmission must be present. The chain of transmission is the same regardless of the disease-causing organism. The disease-causing organism and the body's immune response will vary from case to case.

CAL FIRE emergency response personnel and peace officers are at increased risk for exposures to bloodborne infections. Major sections of this supplement have been adapted from the "AIDS Education for Emergency Workers" manual, from the American Red Cross, Sacramento Chapter. It is not to be used as a substitution for training in infectious disease, but rather as a supplement for basic infectious disease training.

Some portions of this manual were adapted from Control of Communicable Disease in Man, 14th Edition. Abram S. Benenson, editor.

**CHAIN OF TRANSMISSION**

If an infection is to occur, six very specific elements must be present. These elements are the infectious agent and the five components of the chain of transmission.

An infectious agent is a disease-causing organism. This includes organisms like bacteria, chlamydiae, fungi, molds and yeasts, worms, protozoa, rickettsiae, and viruses.

Although the vehicles of transmission of disease-causing organisms vary, the links of the "chain of transmission" remain the same regardless of the disease-causing organism involved. This is an important concept to grasp, since it provides the theoretical basis for preventing the spread of communicable diseases. In other words, if one or more components of the chain are interrupted, the disease will NOT occur. The five components of the chain are discussed below.

1. **Reservoir**: Location where the disease-causing organisms grow, nourish, and reproduce. Reservoirs may include such things as animals, people, and plants. The human body is a common reservoir for microorganisms. The surface of the
skin and the fluids and organs of the human body serve as a reservoir for both harmless and harmful organisms.

2. **Portal of exit**: Opening by which the disease-causing organism leaves the reservoir. In the human reservoir, there are various portals of exit.

3. **Means of transmission**: Vehicle by which disease-causing organisms leave the reservoir en route to a new host. Although some disease-causing organisms tend to be transmitted by specific means, they may be transmitted by more than one means.

4. **Portal of entry**: Opening by which the disease-causing organism enters the new host. Generally, disease-causing organisms enter another human body by the same route through which they exited the previous human body.

5. **Susceptible host**: Host organism/body with the ability to develop an infection. Susceptibility is the measure of an individual's vulnerability to a particular disease or infectious agent. A person who is in good health or has been vaccinated against certain disease-causing organisms is less susceptible to those disease-causing organisms than a person whose susceptibility has been compromised by age, genetics, lack of vaccinations, poor nutrition, chronic illness, stress or other circumstances.

**METHODS OF TRANSMISSION**

Communicable diseases can be transmitted from a person or animal to another person or animal. The infectious agent for most communicable diseases is transmitted by one of four methods. These methods are:

1. **Airborne transmission** resulting from the inhalation of the residue of evaporated droplets that remain suspended in the air after coughing, sneezing, and talking.

2. **Contact transmission** resulting from the susceptible host coming into contact with fluids or substances capable of transmitting disease-causing organisms from an infected person or animal. Contact transmission methods include:
   - Direct contact between a susceptible host and an infected person in which there is a direct exchange of blood or other body fluids capable of transmitting disease-causing organisms.
   - Indirect contact between a susceptible host and a contaminated inanimate object (needlestick-type injuries).
3. **Enteric (fecal-oral) transmission** resulting from ingestion of disease-causing organisms such as salmonella, often through fecally contaminated food and water, by a susceptible host.

4. **Vector-borne transmission** resulting when an intermediate carrier (vector), usually an insect or animal, transmits a disease-causing organism to a susceptible host, often through a bite.

The common cold and flu are examples of communicable diseases because disease-causing organisms are involved. Cirrhosis of the liver is an example of a non-communicable disease since no disease-causing organism is involved.

People or animals are said to be infectious when they are capable of transmitting a disease-causing organism to another person or animal. For example, lice are considered communicable because they can be transmitted to another, but not considered infectious because this transmission does not involve a disease-causing organism. On the other hand, a dog or rodent with rabies is considered infectious because it can transmit the communicable disease-causing virus.

**THE HUMAN BODY’S DEFENSE AGAINST INFECTION**

The human body is remarkable in its ability to resist numerous organisms and hazardous materials that can damage it. This resistance is accomplished by physical and chemical barriers to infection, the inflammatory response, and the immune response.

1. **Physical barriers** like intact skin prevent many foreign substances, including some microorganisms and hazardous materials, from entering the body.

    **Intact skin is the first line of defense against the transmission of most diseases.**

    The mucous membranes, which include the linings of the digestive, respiratory, reproductive, and urinary tracts, secrete a fluid (mucous) that entraps small foreign particles, so they can be swept away, or engulfed by special cells capable of digesting particles or cells harmful to the body.

2. **Chemical barriers** include the secretions of the sweat glands and the oil secreting glands of the skin, which are toxic to many different types of bacteria. Acidic gastric secretions protect the stomach.
3. **The inflammatory response** is the body's non-specific response to tissue injury or bacterial invasion. Generalized response includes movement to the invaded area of plasma proteins and phagocytes that can inactivate or destroy the invader, removal of debris, and the initiation of tissue repair.

4. **The immune response** is the body's reaction to substances that are foreign or are interpreted as being foreign. This process can take different forms including the specific immune response.

   A specific immune response occurs in the presence of a specific antigen or disease, and involves all the changes associated with antigen contact by the immune system.

   For each immune response, there are four phases:
   
   - Recognizing the enemy
   - Mounting defenses
   - Attack
   - Suppression of the immune response (shutting off the response when the job is done)

   One way to understand how the immune system works is to compare it to armies on a battlefield. There are three different white blood cell "armies", each charged with a special task, which circulate throughout the human bloodstream.

   Army number one is composed of macrophages, which are cells that first ingest and "process" a foreign invader. Acting as the body's "early warning system", macrophages perform reconnaissance, then chemically inform the field commanders, called T-helper cells, of the alien invasion. The T-helper cells issue orders for the subsequent immune response.

   A second army of B cells is then mobilized by the T-helper cells. By means of cellular signals and hormones, B cells, acting as a biological arms factory, begin to manufacture chemical weapons called antibodies. These molecules are directed specifically against the particular foreign agent.

   Once they arrive on the scene, these specifically designed antibodies either neutralize the enemy or tag it for attack by other cells or hazardous materials.
In addition to the antibodies that circulate in the bloodstream, a third army of cell-killing T-cells is mobilized. Thus, under normal circumstances, an infecting microbe would be subjected within a few hours or days to an overwhelming assault of macrophages, antibodies, killer T-cells and other inflammatory toxins.

Naturally, such a response may also release substances that cause the cardinal signs and symptoms of infection such as fever, malaise, muscle aches, and fatigue. Once the microbe is successfully eliminated, the immune system's response subsides and the symptoms abate.

Remarkably, the B and T-cells become programmed for life to remember the particular invading microbe. If needed, they are ready to launch a more vigorous, immediate response if the enemy microbe reappears. This process is referred to as "natural immunity" and it only occurs when a person is infected with a specific disease and his body responds by creating antibodies against that specific organism. In most instances, "natural immunity" protects a person from contracting the same disease twice.

"Passive immunity" is given to a person through the administration of serum taken from an immune person. Hepatitis B Immune Globulin (HBIG) is an example of passive immunity. HBIG is prepared from plasma of infected persons who have developed antibodies against the HB virus and gives passive immunity to the person who has not developed an antigen/antibody response. It is one type of post-exposure prophylactic measure.

"Active immunity" is created in a person by administering an "antigenic stimulus." This means that the person is inoculated with a substance that stimulates the body into creating the antibodies that will defend the person against the actual disease. Hepatitis B vaccine stimulates the body to develop antibodies against the hepatitis B virus.

Immunizations can give passive or active immunity to several contagious diseases that are potential health hazards to emergency personnel. Many persons will have natural immunity to certain diseases, such as chicken pox. Emergency response personnel shall consult with their personal health care provider to review their past medical history and verify that they are current for the following immunizations: MMR- Measles (rubeola), mumps, and rubella (German measles), Td (tetanus-diphtheria), and hepatitis B.

Emergency response personnel shall also consult their health care provider or county health office concerning a surveillance skin test, a Purified Protein Derivative (PPD), for tuberculosis. A negative PPD indicates that a potential exposure to a patient infected with tuberculosis did not result in an exposure or infection. A positive PPD indicates the body has mounted an immune response due to an exposure to tuberculosis.
There are no vaccines for certain diseases. However, post-exposure prophylaxis may be available. Immune gamma globulin can be given as post-exposure prophylaxis for viral hepatitis "A". It helps the body's immune system develop a response to infection.

**CHICKEN POX (Varicella)**

Chicken pox is one of the most highly contagious communicable diseases. An acute viral disease that occurs primarily in children, chicken pox can have severe effects on adults and persons with compromised immune systems. Chicken pox is characterized by slight fever, discomfort or uneasiness, loss of appetite, and a distinctive, severe itching. Chicken pox is caused by the same virus that is responsible for shingles (herpes zoster).

1. **Infectious agent**: Varicella zoster virus (VZV).

2. **Reservoir**: Human.

   **Incubation period**: Generally 13 to 17 days; however, may range from 2 to 3 weeks.

   **Period of communicability**: As long as 5 days, but generally 1 to 2 days before the development of a rash. No longer than 6 days after the first appearance of lesions. Chicken pox is most contagious in the early stages of eruptions of the skin lesions.

3. **Portal of exit**: Mouth, nose, and draining skin lesions of infected person.

4. **Means of transmission**:

   **Airborne**: Respiratory secretions.

   **Direct Contact**: Discharges from draining skin lesions, or drainage from mouth and nose.

   **Indirect Contact**: Touching articles freshly soiled with discharges from nose, throat, and/or lesions.

   **Droplet Contact**: Touching infected droplets (droplet nuclei) from nose or throat and not washing hands prior to touching around mouth and nose.

5. **Portal of entry**: Mouth and nose of susceptible host.
6. **Susceptible host:** Anyone NOT previously infected with chicken pox.

**Preventive measures:** If immunity has not resulted from a previous attack, avoid contact with infected persons if possible.

Congenital and adult chicken pox may have severe effects. No immunization is available, and persons at risk, who have been exposed to this disease, shall contact their physician and consider treatment with varicella-zoster immunoglobulin to reduce the severity of the infection.

Many persons will have natural immunity to chicken pox.

**COMMON COLD and INFLUENZA (FLU)**

An acute viral infection of the upper respiratory tract usually lasting 2 to 7 days, the common cold is characterized by a feeling of burning and irritation in the nose and throat, closely followed by sneezing, chilliness, abundant nasal discharge, muscular aching, discomfort or uneasiness, and headache. Fever is uncommon in children and rare in adults.

An acute, highly contagious viral infection of the respiratory tract, influenza is characterized by fever, chills, headache, sore throat, loss of appetite, generalized muscular aches and pains, sneezing, and a severe, dry cough.

1. **Infectious agent:**

   **Common cold:** Wide range of agents have been identified.

   **Rhinovirus:** More than 30 types identified. Adenovirus, ECHO virus, Coxsackievirus, influenza viruses, parainfluenza viruses, and mycoplasmal organisms.

   **Influenza:** Three types of virus (A, B, & C) with numerous sub-groupings recognized.

2. **Reservoir:** Human.

   **Incubation period:**

   **Common cold:** Between 12 and 72 hours, usually 24 hours.

   **Influenza:** Usually 24 to 72 hours.
Period of Communicability:

**Common cold**: From 3 to 5 days prior to the onset of symptoms to 5 days after.

**Influenza**: Probably limited to 3 days from the onset of symptoms.

3. **Portal of exit**: Mouth or nose of infected person.

4. **Means of transmission**:

   **Airborne**: Respiratory secretions. Especially among crowded populations in enclosed spaces such as buses, schoolrooms, public buildings, jails, prisons, etc.

   **Direct contact**: Discharges from nose and/or throat. Direct oral contact. 
   **Droplet spread**: touching droplets and not washing hands prior to touching around mouth and nose.

   **Indirect contact**: Touching articles freshly soiled with discharges from nose and throat.

5. **Portal of entry**: Mouth and nose of noninfected person.

6. **Susceptible host**: Anyone.

**Preventive measures**: Cover nose and mouth when coughing and sneezing, use disposable tissues and dispose of soiled tissues in the proper manner, practice frequent, proper hand washing, maintain proper nutrition, practice stress reduction, and maintain flu vaccination.

**CYTOMEGALOVIRUS (CMV, Generalized salivary gland disease, cytomegalic inclusion, [GID])**

Cytomegalovirus is a viral infection characterized by discomfort, fever, swollen lymph nodes, pneumonia, enlargement of the liver and spleen and new infections caused by an organism other than CMV, which result from a compromised immune system. It is estimated that four out of five people have been infected by the time they reach 6 years. In most cases, the disease is so mild that it is not noticed. However, during pregnancy, CMV can lead to birth defects including brain damage and possibly still birth.
1. **Infectious agent:** Cytomegalovirus (a member of the herpes family).

2. **Reservoir:** Human (asymptomatic or symptomatic).
   
   **Incubation period:** Information inexact. Observed 3 to 8 weeks after transfusion, and 3 to 12 weeks after delivery in cases involving childbirth.

   **Period of communicability:** Virus is excreted in urine and saliva for many months and may persist for years with initial infection.

3. **Portal of exit:** Urethra, vagina, mouth, milk-producing duct of the female breast, and anus of infected person.

4. **Means of transmission:**
   
   **Direct contact:** Blood, breast milk, feces, saliva, semen, urine, vaginal and cervical secretions. Mother to child across the placenta. Recipients of blood transfusions or donor organs.

   **Enteric (fecal-oral):** Ingestion of infected urine or fecal particles.

5. **Portal of entry:** Urethra, vagina, mouth, broken (non-intact) skin.

6. **Susceptible host:** Anyone.

**Preventive measures:** Frequent, proper handwashing, and use of gloves when handling urine and saliva, performing procedures such as child birthing, or handling articles contaminated with these or other body secretions.

Pregnant females shall avoid individuals with confirmed or suspected CMV infection because of potential risk of transmission to the developing fetus.

**GONORRHEA**

Gonorrhea is a common, sexually transmitted disease affecting the genito-urinary tract of both males and females. Untreated in females, gonorrhea can progress to pelvic inflammatory disease (PID) and sterility. Although treatable, gonorrhea has developed an increasing resistance to standard antibiotic therapy.

1. **Infectious agent:** Neisseria gonorrhoeae (a bacteria).
2. **Reservoir**: Human (asymptomatic or symptomatic).

   **Incubation period**: Generally 2 to 7 days, but may extend longer.

   **Period of communicability**: May extend for months if not treated.

3. **Portal of exit**: Urethra, vagina, mucous membranes lining eyelids (conjunctivitis).

4. **Means of transmission**:
   - **Direct contact**: Primarily, exchange of infected semen, cervical and/or vaginal secretions. Contact with infected discharges or mucous membranes. During the birthing process from mother to child while passing through an infected birth canal.

5. **Portal of entry**: Urethra, vagina, mucous membranes, mouth, broken (non-intact) skin, rectum.

6. **Susceptible host**: Anyone.

   **Preventive measures**: Gloving when in contact with fluids capable of transmitting bacteria; good personal hygiene, including frequent, proper handwashing; and barrier protection during sexual contact.

   Exposure to infants during the birthing process can lead to infection of neonates’ eyes and, if untreated, can progress to scarring and blindness. No immunization available. One attack does not protect against subsequent infection.

**MEASLES**

A. **Measles/Rubella** (German measles, 3-day measles)

Rubella is an acute, mildly contagious, viral infection, that resembles both scarlet fever and measles (rubeola), but differs in its duration. Rubella is characterized by a low-grade fever, usually discomfort or uneasiness, loss of appetite, runny nose, swollen neck, and swelling behind the ears. Joint pain is especially common in adolescent females. Rubella produces a pale, red rash which begins on the face and covers the trunk and extremities in hours, and which usually begins to fade on the second day. Prior to this rash, small, red spots can sometimes be seen on the upper back portion of the mouth (soft palate).
1. **Infectious agent:** Rubella virus.

2. **Reservoir:** Human.

   **Incubation period:** From 16 to 18 days. Variable 14 to 21 days.

   **Period of communicability:** Approximately 1 week before and at least 4 days after onset of rash.

3. **Portal of exit:** Nose, mouth.

4. **Means of transmission:**
   - **Airborne:** Nose and throat secretions of infected persons.
   - **Direct contact:** With oral secretions of infected person. Possibly urine of infants with congenital rubella syndrome.
   - **Indirect contact:** Touching articles freshly soiled with nose and throat secretions from infected person.
   - **Droplet contact:** Touching infected droplets from nose and throat of infected person and not washing hands prior to touching around mouth and nose of susceptible host.

5. **Portal of Entry:** Nose, mouth.

6. **Susceptible host:** Anyone who has not developed acquired immunity as a result of having the disease, or has not been vaccinated. Immunity can be verified through blood test or documentation. Persons born in 1957 or later should be able to verify immunity or receipt of two measles-containing vaccines on or after their first birthday and at least one month apart. Persons born before 1957 should document immunity or they should have received one dose of the measles-containing vaccine on or after their first birthday.

   **Preventive measures:** Frequent, proper handwashing, covering nose/mouth when coughing or sneezing, proper disposal of soiled tissues or other contaminated articles, and vaccination of all children.

   Transmission is the same as rubeola.
**Special note:** Persons assigned to a work environment where they are exposed to large populations in confined areas, such as hospitals, jails, and juvenile halls, shall have a blood test to determine if they have ever been exposed to rubella, or if the vaccine is still working to prevent the infection.

All persons who cannot verify immunity to rubella or that they have received one dose of a rubella-containing vaccine on or after their first birthday shall receive an immunization.

Pregnant females shall consider temporary reassignment since exposure to rubella during the first trimester of pregnancy can cause irreversible damage to the fetus.

Immunization of pregnant adults or females who expect to become pregnant in the next 1 to 2 months is contraindicated.

B. **Measles/Rubeola**

Measles/Rubeola is one of the most serious of childhood diseases. It is an acute, highly contagious viral infection characterized by a very high fever (103 to 106 degrees F); a dry, hacking cough; loss of appetite; runny nose; hoarseness; red, watery eyes; sensitivity to light; general discomfort or uneasiness; a macular rash; and tiny, bluish-gray spots surrounded by a red halo on the oral mucosa opposite the gums. These spots are the hallmark of this infection.

1. **Infectious agent:** Paramyxoviridae (a virus).

2. **Reservoir:** Human.

   **Incubation period:** Approximately 10 days, varying from 8 to 13 days from exposure to the onset of fever. About 4 days later a rash will appear.

   **Period of communicability:** Slightly before the onset of symptoms to 4 days after appearance of rash. Communicability is minimal during the second day of rash.

3. **Portal of exit:** Nose, mouth.

4. **Means of transmission:**

   **Airborne:** Nose and throat secretions of infected persons.

   **Direct contact:** With oral secretions of infected person. Possibly urine in infants with congenital rubella syndrome.
**Indirect contact**: Touching articles freshly soiled with nose and throat secretions from infected person.

**Droplet contact**: Touching infected droplets from nose and throat of infected person and not washing hands prior to touching around mouth and nose of susceptible host.

5. **Portal of entry**: Nose, mouth.

6. **Susceptible host**: Anyone who has not developed acquired immunity as a result of having the disease, or has not been vaccinated.

**Preventive measures**: Frequent, proper handwashing; covering nose/mouth when sneezing; proper disposal of soiled tissues or other contaminated articles; and vaccination of all children prior to attaining school age.

The measles vaccine shall be given to persons who cannot verify immunity. Immunity can be verified through blood test or documentation. Persons born in 1957 or later should be able to verify immunity or receipt of two measles-containing vaccines on or after their first birthday and at least one month apart. Persons born before 1957 should document immunity or they should have received one dose of the measles-containing vaccine on or after their first birthday.

The MMR vaccine is the vaccine children receive to protect them from measles, mumps and rubella. The vaccine for rubeola, rubella, and/or the MMR can be obtained at county health agencies or private health care providers. The side effects may include fever and/or rash (5 to 15 percent of the population develop side effects) and/or soreness at the injection site.

**Complications** related to rubeola contracted by an adult include severe inner ear infection, pneumonia, and inflammation of the brain. A vaccine to prevent the occurrence of rubeola is available for children.

**MENINGITIS**

Meningitis is a general term used to describe an "inflammation of the covering over the brain and spinal cord." There are two types of meningitis: bacterial, which includes flu bacterial and meningococcal bacterial; and viral or aseptic meningitis. Bacterial meningitis is always treated as a medical emergency, while viral meningitis is usually self-limiting and benign, and treatment is mainly symptomatic.
1. **Infectious agent:**

   **Bacterial meningitis:** Neisseria meningitides, Hemophilus influenzae, Streptococcus pneumoniae.

   **Meningococcal meningitis:** Neisseria meningitides.

   **Viral meningitis:** A wide variety of infectious agents, many associated with specific disease. Ex.: mumps virus, enteroviruses (picornavirus).

2. **Reservoir:** Human (asymptomatic or symptomatic).

   **Incubation period:**

   **Bacterial:** Short. Probably 2 to 4 days.

   **Meningococcal:** 2 to 10 days; average, 3 to 4 days.

   **Viral:** 2 to 21 days dependent on agent (reservoir varies with specific agent).

   **Period of communicability:**

   **Bacterial & meningococcal:** Until meningococci are no longer present in discharge from nose and mouth.

   **Viral:** Varies with specific agent.

3. **Portal of exit:**

   **Bacterial & meningococcal:** Mouth, nose of infected person.

   **Viral:** Varies with specific agent.

4. **Means of transmission:**

   **Bacterial & meningococcal:** Droplet infection, discharges from nose and throat.

   **Viral:** Varies with the specific causative agent involved.
5. **Portal of entry:**

   **Bacterial & meningococcal:** Usually nose and mouth.

   **Viral:** Varies with specific agent.

6. **Susceptible host:** Bacterial, meningococcal, or viral: Anyone.

   **Preventive measures:** Use CAUTION when ventilating persons without barrier protection, (i.e., rescue breathing and CPR), vaccination for meningococcal meningitis, maintaining optimum health status, and washing hands frequently and properly.

   Ventilate sleeping quarters (e.g., fire stations, etc.), limit over-crowding in custodial settings. Almost any bacteria gaining entry into the body can cause meningitis.

   Flu meningitis most commonly occurs in children between the ages of 1 and 4 years.

   Meningococcal meningitis is most common among children and adolescents.

   Viral meningitis may result from the mumps virus or one of the picornaviruses. In some cases of viral meningitis, no causative organism is ever found.

   Classic symptoms of meningitis are intense headache, prostration, nausea/vomiting, stiff neck, chills, delirium/coma, and rapid onset of fever.

   Classic signs of meningitis and meningeal irritation are rigidity of the neck, inability to straighten knee when hip is flexed, and flexion at the hip and knee in response to forward flexion of the neck. Bulging soft spots on an infant's head are symptomatic of increased intracranial pressure (ICP) - a medical emergency.

**TUBERCULOSIS (Pulmonary TB and Laryngeal TB)**

Tuberculosis is carried in airborne particles, known as droplet nuclei, that can be generated when persons with pulmonary or laryngeal tuberculosis disease sneeze, cough, speak or sing. The particles are so small (1 to 10 microns) that normal air currents keep them airborne and can spread them throughout a room or building. Infection occurs when a susceptible person inhales droplet nuclei containing M. tuberculosis, and the bacteria become established in the alveoli (air cells of the lungs) and spread throughout the body. Two to ten weeks after initial human infection with M. tuberculosis, the immune response usually limits further multiplication and spread of the tuberculosis bacilli. For a small proportion of newly infected persons, usually less
than 1 percent, initial infection rapidly progresses to clinical illness. However, for another group, approximately 5 to 10 percent illness develops after an interval of months, years or decades when the bacteria begin to replicate and produce disease. The risk of progression to active disease is markedly increased for persons with HIV infection.

1. **Infectious agent**: Bacteria/bacillus, primarily *Mycobacterium tuberculosis* (M. tuberculosis)

2. **Reservoir**: Primarily human beings.

   **Incubation period**: Approximately 2 to 10 weeks after exposure, a person may develop a positive response to a tuberculin skin test, indicating TB infection. Without treatment, active TB disease occurs in 5 to 10 percent of infected people sometime in their lives.

   **Period of communicability**: Persons with active tuberculosis disease who have been placed on medication for at least two weeks usually become noninfectious. Hospitalization is rarely needed. Most persons remain at home during the first several weeks of medication, and after laboratory confirmation of noncommunicability, resume normal daily life activities. Medication is continued for a period of 6 to 18 months. In order not to develop resistance to TB medication, it is important to complete the full prescribed length of time for all TB medications. Persons with positive tuberculin skin tests without active disease cannot spread TB.

3. **Portal of exit**: Mouth or nose.

4. **Means of transmission**:

   **Airborne**: Inhaling or breathing infectious airborne droplets transmitted from an infectious person (e.g., through coughing, sneezing, singing, talking). Droplets larger than ten microns are too large to deposit in the air sacs in the lungs (alveoli) where infection is initiated. Methods once thought important in inhibiting transmission of tuberculosis--boiling dishes or wearing gloves--are ineffective and unnecessary.

   **Direct contact**: Prolonged close exposure to an infectious case may lead to infection of contacts. Invasion through mucous membranes or breaks in the skin is extremely rare.

   **Indirect contact**: With contaminated articles or dust which may occur but is extremely rare.
**Droplet contact:** Touching infected droplets (droplet nuclei) from nose or throat and not washing hands prior to touching around nose and mouth.

**Enteric (fecal-oral):** Bovine tuberculosis results from exposure to infected cattle, usually by ingestion of unpasteurized milk or dairy products.

5. **Portal of entry:** Mouth and nose. Enters by inhaling infectious airborne droplets that are ten microns or less in diameter (less than 1/5000th of an inch).

6. **Susceptible host:** Anyone, especially those in the high risk groups listed below.

**Preventive measures:** Isolate infectious patients from general inmate population in custody setting. Maintain optimum personal health status, and practice good hygiene including frequent proper handwashing.

**Symptoms:** General symptoms may include feeling weak or sick, weight loss, fever, and/or night sweats. Symptoms of pulmonary TB may include cough, chest pain, and/or coughing up blood.

**Tuberculosis Disease**

People with TB disease are sick from bacteria that are active in their body. They usually have one or more of the symptoms of TB. These people are often capable of giving the infection to others. Permanent body damage and death can result from this disease. Medications which cure TB are prescribed for a period of 6 to 18 months.

**Tuberculosis Infection:** People with TB infection (without disease) have the bacteria that causes TB in their body. They are not sick because the bacteria lies inactive in their body. They cannot spread the bacteria to others. However, these people may develop TB disease in the future, especially if they are in one of the high risk groups. Medication is often prescribed for persons with TB infection who are in a high risk group to prevent them from developing TB disease.

**Tuberculosis Testing:** Tuberculin skin testing using the Mantoux ("man-too") method is the standard method of determining TB infection. The test is usually done on the inside of the arm. The person getting the test must return in 48 to 72 hours to determine if there is a reaction to the test. If there is a reaction, the size of the reaction is measured. A positive reaction usually means that the person has been infected with the TB bacteria. It does not necessarily mean that the person has TB disease. Other tests, such as an x-ray or sputum sample, are needed to see if the person has TB disease.
Positive reactors need to be followed up with chest x-ray or other diagnostic evaluation. The use of Isoniazid (INH) prophylaxis shall be determined by one's personal health care provider. INH is a medication developed to treat TB.

A negative test usually means the person is not infected. However, the test may be falsely negative in a person who has been recently infected. It usually takes 2 to 10 weeks after exposure to a person with infectious TB disease for the skin test to become reactive. The test may also be falsely negative if the person's immune system is not working properly.

A Purified Protein Derivative (PPD) can often be obtained through health care providers as part of a physical assessment. PPDs can also be obtained through the county health services' public health clinics for a minimal cost.

**Tuberculosis Treatment**: Tuberculosis disease is treated with medications taken for a 6 to 18-month period. Most persons become noninfectious after the first two weeks of taking medications. Hospitalization is rare. Most persons remain at home during the first several weeks of medication, and after laboratory confirmation of noncommunicability, resume normal activity. Persons in institutions such as correctional facilities shall be placed in isolation during the first several weeks of medication, until laboratory studies and clinical assessment show they are no longer infectious. In order not to develop resistance to TB medication, it is critical to complete the fully prescribed length of time for taking TB medication.

Treatment for tuberculosis infection is prescribed to prevent persons from progressing to TB disease. Medication is prescribed for a 6 to 12-month period. Treatment for TB infection is usually recommended for persons who are in a high risk group to prevent them from developing TB disease.

**Multi-drug-resistant Tuberculosis** (MDRTB): MDRTB develops in a person who is being treated for tuberculosis, but who does not take the prescribed amount of TB medication for the prescribed length of time. This causes the remaining bacteria in the person to become resistant to the TB medications that were being taken. Thereafter, these same medications can never be used to treat this patient for TB.

The MDRTB bacteria can also be spread to other persons in the same manner as regular M. tuberculosis. Therefore, the MDRTB spread to other patients will likewise be resistant to the same medications.

**High risk groups**: Anyone can get TB, but some people are at higher risk. Those at higher risk include:

- people who share the same breathing space (such as family members, friends, co-workers) with someone who has TB disease in the communicable stage.
• poor people and homeless people who are medically underserved.
• foreign-born people from countries where many people have TB.
• nursing home residents and employees.
• prisoners and correctional facility personnel.
• people with medical conditions such as diabetes, certain types of cancers, and those who are underweight.
• people with HIV infection.
• personnel who work in a setting which serves any of the high risk groups.

Considerations:

A. **Surveillance**: Personnel in high risk settings shall receive a *Mantoux* tuberculin skin test at least annually. Persons with a documented history of a positive TB skin test or adequate treatment for disease or infection should not undergo repeat tuberculin skin testing. All tuberculin skin tests must be administered, read (by health care providers), and recorded in millimeters of induration (swelling) according to current guidelines.

One of the purposes of annual screenings is to identify persons who have recently become infected with TB, as indicated by tuberculin skin tests that convert from negative to positive. Converters need to have a medical evaluation including a chest x-ray to make sure they do not have active TB. Once active TB has been ruled out, converters are usually prescribed prophylactic treatment to prevent their TB infections from progressing to active TB disease.

Medical evaluations shall also be performed the first time an individual is found to have a positive TB skin test. Baseline chest x-rays are needed for persons known to be infected with HIV, and for all persons with positive tuberculin skin tests.

B. **Training**: Employees need to be trained to recognize, and bring to the attention of their supervisors, any persons with symptoms suggestive of TB, such as a cough lasting three weeks or more, weight loss, fever, or fatigue. Employees shall be notified that persons infected with HIV are at higher risk for developing TB.
C. **Containment:** The best way to prevent TB transmission is to find all suspected or known infectious TB cases, isolate them, and begin treatment, which rapidly diminishes their infectiousness. All patients with known or suspected infectious TB must be placed in special isolation rooms meeting Centers for Disease Control recommendations for TB isolation. Ventilation systems in such rooms should be designed and regularly maintained in consultation with qualified experts.

Good ventilation, which exhausts air to the outside, should be maintained in facilities and settings that serve persons who are at high risk for tuberculosis. Formerly used methods--wearing gloves or boiling dishes--are ineffective and unnecessary.

Standard surgical masks may not be effective in preventing inhalation of droplet nuclei, because some are not designed to provide a tight face seal and to filter out particulates in the droplet nucleus size range (1 to 5 microns). A better alternative is the disposable particulate respirator (PR). PRs were originally developed for industrial use to protect workers and, in fact, are currently certified by the National Institute of Occupational Safety and Health (NIOSH) for use in industrial settings. Although the appearance and shape of PRs may be similar to that of cup-shaped surgical masks, they provide a better facial fit and better filtration capability. However, their efficacy in protecting susceptible persons from infection with tuberculosis has not been demonstrated.

PRs may be most beneficial in the following situations: a) when appropriate ventilation is not available and the patient's signs and symptoms suggest a high potential for infectiousness; b) when the patient is potentially infectious and is undergoing a procedure that is likely to produce bursts of aerosolized infectious particles or to result in coughing or sputum production, regardless of whether appropriate ventilation is in place; and c) when the patient is potentially infectious, has a productive cough, and is unable or unwilling to cover coughs.

Comfort influences the acceptability of PRs. Generally, the more efficient the PRs, the greater the effort of breathing through them, and the greater the perceived discomfort. A proper fit is vital to protect against inhaling droplet nuclei. (Note that the presence of facial hair will prevent a proper fit.) When gaps are present, air will preferentially flow through the gaps, allowing the PR to function more like a funnel that a filter, thus providing virtually no protection.
LICE

Pediculosis is the term used to describe the condition of being infected with lice (visible, gray, oval-shaped, wingless insects). Lice lay their eggs (nits) in the hairy parts of the body or on clothing fibers. Lice feed on human blood, which they suck from the skin. When lice bite, they inject a toxin that produces a red to purple spot. These bites cause intense itching, which often leads to excoriation of the skin, and the potential for developing a secondary bacterial infection. There are three types of lice: head lice (pediculosis capitis), which infest the scalp, body lice (pediculosis corporis), which infest the skin and body, and pubic lice (phthirus pubis), which infest the pubic hair region. Pubic lice are also referred to as crab lice. Lice are generally considered communicable, but not infectious. Although body lice have been linked to transmission of typhus, trench fever, and louse-borne relapsing fever, in general, lice simply irritate their hosts.

1. Infectious agent:

   Head louse: pediculosis capitis

   Body louse: pediculosis corporis

   Pubic louse: phthirus pubis
2. **Reservoir**: Infested persons.

   **Incubation period**: Under optimum conditions, the eggs of lice hatch in a week, and sexual maturity is reached in approximately 2 weeks.

   **Period of communicability**: As long as lice remain alive on the infested person or in their clothing, and until eggs in hair and clothing have been destroyed.

3. **Portal of exit**: Lice infested scalp, pubic hair, skin.

4. **Means of transmission**:

   **Direct contact**: With an infested person. While other means are possible, crab lice are usually transmitted through sexual contact.

   **Indirect contact**: Touching infested personal belongings, especially clothing and headgear.

5. **Portal of entry**: Scalp, pubic hair, skin.

6. **Susceptible host**: Anyone.

**Preventive measures**: Avoid physical contact with infested persons and their belongings, practice good personal hygiene, and do not share clothing, hairbrushes, etc. Launder clothing and bedding in hot water (55 degrees C or 131 degrees F for 20 minutes) or dry clean to destroy nits and lice.

There are several over-the-counter shampoos that effectively treat head lice.

Infestation of lice in the custody setting (i.e., jail/prison) is always a medical emergency, and can be treated effectively with medication. In custody settings, treatment protocols should be in place since the treatment of lice and scabies differs.

**LYME DISEASE**

1. **Infectious agent**: The spirochete B. burgdorferi.

2. **Reservoir**: Animal host - mice, deer, birds and wild animals.

   **Incubation period**: 65 percent of patients have symptoms 3 to 4 days after the bite, with a spreading ring-like rash called "erythema chronicum migrans".
Period of communicability: Lyme disease is not transmitted human to human. Ticks can transmit B. burgdorferi any time during their two-year life cycle. A large number of lyme disease cases are reported in late spring and early summer. This suggests that ticks in the nymphal stages most readily transmit the disease.

3. **Portal of exit**: The organism is infected with the saliva of the tick when it feeds.

4. **Means of transmission**:

   **Tick borne**: Isodes dommini (Eastern states) - deer tick. Ixodes pacificers (Western states).

   **Direct contact**: Mother to unborn child.

5. **Portal of entry**: Tick bite.

6. **Susceptible host**: Anyone. Transplacental transmission of B. burgdorferi has been reported.

Early recognition of Lyme disease is important. If a tick is attached to the skin or if an employee was in an area where ticks are known to occur and the employee notes any of these symptoms listed below, the employee shall consult their personal health care provider. The information, together with a blood test, will help the health care provider make a diagnosis. Treatment with antibiotics during the early stage can cure the infection and prevent complications associated with stages 2 and 3. Antibiotic treatment of the later stages of lyme disease is often, but not always, successful.

Lyme disease can be contracted during any season of the year. An early sign of Lyme disease may include a spreading rash which may be accompanied by flu-like symptoms, fever, aches and/or fatigue. Possible complications of the heart and/or nervous system may occur as well as severe arthritis. The disease commonly has three stages, but these stages may not all occur or they may overlap.

**Stage 1 (localized erythema migrans)**

The first recognizable sign usually is a slowly enlarging red rash, known as erythema migrans (EM), about the size of a half dollar or larger. The rash occurs 3 to 30 days (average 7 to 9 days) after the bite of an infected tick. The rash expands over a period of days or weeks to form a large circular lesion, often with a central clearing. This occurs in about 60 to 80 percent of infected persons. One or more rashes may appear on the body.
Flu-like symptoms may also occur in this stage. These symptoms may persist, change, disappear and reappear intermittently for several weeks. A tick bite may be followed by a reaction within hours, creating a redness at the site of the bite which does not expand and which disappears within a couple of days; this must not be confused with Lyme disease.

Stage 2 (disseminated infection)

During this stage the patients may experience migratory pain in joints, tendons, muscles, and bones, often without joint swelling or redness. Infected persons are often quite ill.

Some infected persons may develop long-term complications weeks to months after the initial symptoms. These complications may include disorders of the heart or nervous system. Abnormalities of the heart include varying degrees of heart block. Facial paralysis (Bell's palsy) and other nervous system abnormalities may occur.

Stage 3 (persistent infection)

Months to years after disease onset, patients may develop joint pain that appears and disappears intermittently for several years. Large joints, especially the knees, are most affected. Lyme arthritis may become chronic, with erosion of cartilage and bone. Chronic neurologic symptoms and chronic skin conditions may also occur.

The Western Black-Legged Tick

The Western Black-legged Tick (Ixodes Pacificus) is the only tick of the 49 species occurring in California that is known to transmit Lyme disease. Adult ticks are most commonly found from December through June, during that period of the year when humidity is usually high. The adult female is red-brown with black legs, about 1/8 of an inch long; males are smaller and entirely brownish-black. Both are teardrop shaped. While the Western Black-legged Tick has been reported in 50 of 58 California counties, it is most common in the humid coastal areas and on the western slope of the Sierra Nevada range.

The tick has three active life stages: 1) Immature stages (larvae and nymphs) feed on small rodents, rabbits, lizards, birds and occasionally large mammals. 2) Adults feed on large mammals, including deer, dogs, and humans. 3) All stages feed by embedding their mouth-parts into the skin of a host and taking a blood meal.
Preliminary studies show that white-footed mice and deer may be the primary reservoirs of Lyme disease in California. Larval and nymphal ticks acquire spirochetes from the blood of infected mammals as they feed; the infected nymphs and adults transmit the spirochetes to other mammals (including humans).

Only about 1 to 2 percent of the adult Western Black-legged Ticks in California are infected with the bacterium that causes Lyme disease, and immature ticks have even lower infection rates. In some areas north of the Bay Area the adults may be infected up to 5 percent; this is still much lower than the northeastern U.S. where 30 to 60 percent or more of the adult ticks are infected. Evidence indicates that the bacterium is probably not transmitted to humans until the tick has fed at least 1 to 2 hours.

The Western Black-legged Ticks can be found on grasses and brush in rural and wildland settings which receive afternoon shade. These ticks do not like sunny, open areas. The ticks do not fly, jump, or drop from trees. Ticks climb to the tips of vegetation, typically along animal trails or paths, and wait for an animal or human host to brush against them so they can attach themselves. This behavioral method of finding a host is called questing.

**Tick Avoidance**

- Tuck pants into boots or socks, and shirt into pants.
- Wear light color clothing so ticks can easily be seen.
- Apply insect repellent on pants, socks and shoes. Use a repellent registered for use against ticks.
- Avoid trail margins, brush, and grassy areas when in tick country.
- Check yourself frequently.

**What you should do if bitten by a tick**

Since it usually takes a day or more for the tick to feed, prompt removal of ticks should prevent disease transmission.

- Grasp the tick with a tissue or **tweezers (Never with your bare hands!!)** as close to your skin as possible. If ticks are crushed with bare fingers, exposure to the tick body fluids may lead to transmission of the disease organisms.
- GENTLY pull the tick from the skin. Grasp the tick's mouth parts as close to skin as possible. Do not twist or "unscrew" the tick. **Do not attempt to remove by burning with cigarette or by applying Vaseline, kerosene, etc.; pull straight out.**
• Apply an antiseptic to the bite area after removing the tick. Wash your hands with soap and water.

• **Save the tick for identification in a sealed container!** Contact your local Vector Control, Mosquito Abatement District, or health department to determine if the tick is the one capable of transmitting disease.

• If the tick cannot be removed or part of it is left in the skin, consult your physician.

• Dispose of the tick in alcohol or by flushing it down the toilet after it has been indentified.

**SCABIES**

Scabies is an infectious condition of the skin that occurs when a crab-shaped mite (Sarcoptes scabiei) burrows into the skin of humans. The female of the species burrows into the skin and lays eggs. The larvae of these eggs emerge from the skin, reproduce, and then burrow back into the skin. This vicious cycle can result in chronic irritation and infection of the host. This leads to scratching which promotes the development of sores and scabs. Scabies rarely occur on the head and face. Areas most affected include armpits, buttocks, genital areas, and wrists. Warm, moist skin areas such as between fingers, folds of the skin, inner folds of the arm, and the webs of the toes are common locations for the development of lesions.

1. **Infectious agent:** Sarcoptes scabiei (a mite).

2. **Reservoir:** Human.

   **Incubation period:** 2 to 6 weeks before onset of itching in persons without previous exposure. Persons who have been infested previously develop symptoms 1 to 4 days after exposure.

   **Period of communicability:** Until mites and eggs are destroyed by treatment.

3. **Portal of exit:** Skin of infested person.
4. **Means of transmission:**

   - **Direct contact:** With infested person; however, transfer of mites or eggs is usually by more than casual skin-to-skin contact. Prolonged contact such as in rendering emergency medical care increases the likelihood of transfer of these parasites. Scabies may be acquired during sexual contact.

   - **Indirect contact:** Through handling freshly contaminated garments and bedding of an infested person.

5. **Portal of entry:** Skin (contact), broken skin (burrow of mite).

6. **Susceptible host:** Anyone. However, some resistance is suggested since immunologically compromised persons are susceptible to super-infestation.

**Preventive measures:** Be alert and cautious to anyone complaining of severe itching with trail-like scratches on extremities.

Practice frequent, proper handwashing and proper laundering of contaminated clothing. Dispose of contaminated items properly.

**HERPES SIMPLEX (Herpes Type I, Herpes Type II, and Herpetic Whitlow)**

Herpes simplex is an infectious disease that is characterized by the formation of small, temporary, irritating, and occasionally painful, fluid-filled blisters. Recurrence of infection is directly related to the reactivation of the latent virus. Herpes simplex is classified according to the causative agent.

**Herpes Type I (oral herpes/herpes labialis):**

Caused by the herpes simplex virus type I (HSV-I), it is transmitted by saliva and respiratory secretions and produces the cold sores and fever blisters generally observed on the face, particularly around the gums, lips, and mouth.

**Herpes Type II (herpes genitalis/genital herpes):**

Caused by the herpes simplex virus type II (HSV-II), it is transmitted by direct sexual contact and produces lesions in the genital region of both males and females.
NOTE: Cross-contamination of both HSV-I and HSV-II can occur.

Herpetic Whitlow:

Caused by the herpes virus hominis (HVH), it is transmitted when breaks in the skin of the hands of a susceptible host come in direct contact with infected oral secretions. This herpes infection of the fingers is characterized by pain, swelling, redness, and nerve impairment of the hands and fingers. Herpetic whitlow may also be accompanied by general flu-like symptoms - chills, fever, swollen lymph nodes and uneasiness. This condition is an occupational health risk to persons performing emergency medical and health care tasks such as suctioning.

NOTE: There are no cures for these herpes viral infections. These infections may return from time to time. Treatment is directed at symptoms such as reducing pain and providing support. Prevention measures such as gloving, and frequent, proper handwashing are the best safeguards.

1. Infectious agent: Herpes virus hominis (HVH), herpes simplex virus type I (HSV-I), and herpes simplex virus type II (HSV-II).

2. Reservoir: Human.

   Incubation period: 2 to 12 days.

   Period of communicability:

   HSV-I: Virus in saliva reported as long as 7 weeks with recovery from inflammation of the mouth.

   HSV-II: Genital lesions are infective for 7 to 12 days. Recurrent disease for 4 to 7 days.

   NOTE: Asymptomatic oral and genital infections, resulting from temporary shedding are probably common.
3. **Portal of exit**: Draining skin lesions of infected persons, mouth, urethra, vagina.

4. **Means of transmission**:

   - **Direct contact**: HSV-I and herpetic whitlow: Saliva and respiratory secretions, draining skin lesions, purulent eye drainings.
   - HSV-II: Semen, vaginal and cervical secretions, draining skin lesions, urine, stool.

   NOTE: Cross-contamination of both HSV-I and HSV-II can occur.

5. **Portal of entry**: Broken (non-intact) skin, mouth, mucous membranes.

6. **Susceptible host**: Anyone.

   **Preventive measures**: Proper handwashing, covering mouth and nose when coughing or sneezing, proper disposal of soiled tissues or contaminated objects, use of gloves when in direct contact with potentially infected persons or fluids and during child birthing.

   NOTE: Shingles (herpes zoster) should not be confused with herpes simplex infections. The causative factor of shingles is the herpes virus, varicella-zoster (V-Z), which also causes chicken pox

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**HEPATITIS**

Hepatitis is the term used to describe an inflammation of the liver. Hepatitis occurs worldwide and in many forms. Causative agents include bacteria, toxic substances including drugs and alcohol, and virus. Generally, the various types of hepatitis are manifested in loss of appetite, abdominal and gastric discomfort, abnormal liver function, clay-colored stools, dark urine, enlarged liver and jaundice. Hepatitis can be mild and brief, or severe and life-threatening.

This discussion will be focused on viral hepatitis, which is caused by one of several viral agents.

A **Hepatitis A (Viral hepatitis, infectious hepatitis)**

   1. **Infectious agent**: Hepatitis A Virus (HAV).
   2. **Reservoir**: Human, chimpanzees (rarely); less frequently, certain other non-human primates.
Incubation period: 15 to 50 days (average 28 to 30 days).

Period of communicability: Maximum infectivity is during the later half of the incubation period, continuing for a few days after onset of jaundice. Most cases are probably noninfectious after the first week of jaundice.


4. Means of transmission:


   Indirect contact: Very rarely by the use of contaminated needles and syringes.

5. Portal of entry: Mouth primarily.


Preventive measures: Good sanitation with emphasis on disposal of stool; good personal hygiene including frequent, proper handwashing; and careful handling of blood soiled needles and instruments.

Timely administration of immune serum globulin (ISG) following exposure. Immunity after attack probably lasts for life.

B. Hepatitis B: (Serum hepatitis)

Hepatitis B is a type of viral infection of the liver. It is transmitted by blood or body fluids from a person with active B-virus hepatitis. Anyone who has "blood contact" with a carrier of hepatitis can get the disease. For example, blood contact through an accidental needle stick may result in hepatitis B infection. Emergency care workers can be exposed through contact with the blood or body fluids of patients with hepatitis B. Your risk of developing hepatitis B is directly related to the frequency of exposure and portal of entry for blood or fluids containing the virus.

1. Infectious agent: Hepatitis B Virus (HBV).


   Incubation period: 1 to 6 months; usually 3 months.
**Period of communicability:** Blood is probably infectious for 4 to 6 weeks, possibly longer, before onset of jaundice, and up to 3 months after onset. Some persons have been known to be chronic carriers of the infection.

3. **Portal of exit:** Urethra, vagina, blood vessels.

4. **Means of transmission:**

   - **Direct contact:** With blood, blood products, fluids from open or draining wounds, mucous membrane, saliva, exchange of infected semen, cervical and vaginal secretions.

   - **Indirect contact:** Sharing contaminated needles and syringes. Accidental skin puncture with contaminated needle. Improperly sterilized equipment for ear piercing or tattooing.

   **NOTE:** All blood products should be screened for evidence of HBV.

5. **Portal of entry:** Urethra, vagina, mucous membranes, broken (non-intact) skin, rectum.

6. **Susceptible host:** Anyone who has not been rendered immune after vaccination against the infection.

**Preventive measures:** Frequent, proper handwashing; immunization with vaccine; use of universal precautions; and using care to avoid needlestick injuries.

**High Risk Populations**

Certain population groups found in the United States are much more likely to have been infected with HBV. They are:

- Immigrants or refugees from areas of high HBV endemicity such as China, Southeast Asia, most of Africa, most Pacific Islands, parts of the Middle East and the Amazon Basin.

- Alaskan Natives/Pacific Islanders.

- Clients of institutions for the developmentally disabled (and, to a lesser extent, staff from these institutions).
- IV drug users.
- Sexually active homosexual men.
- Household contacts of HBV carriers.
- Patients of hemodialysis centers.

Hepatitis B is a serious disease and can result in long-term illness or even death. Complications of Hepatitis are as follows:

- One-half of all infected persons are ill, often ill enough to require time off work.
- Five to ten percent develop chronic hepatitis and never recover.
- Two to three percent develop cirrhosis, with permanent liver damage.
- Five to ten percent become chronic carriers and remain infectious themselves for years.
- One in two hundred die rapidly from liver failure.
- There is a link between hepatitis B and later development of liver cancer.

The Centers for Disease Control estimate that there are over 200,000 cases of hepatitis B infection in the United States each year leading to 10,000 hospitalizations. There are 250 deaths due directly to hepatitis, 4,000 deaths related to hepatitis cirrhosis, and 800 deaths due to hepatitis related to primary liver cancer. The incidence of reported clinical hepatitis B has been increasing in the United States from 6.9 per 100,000 in 1978 to 9.9 per 100,000 in 1981, and by 1985 there were 11.5 per 100,000. The CDC have estimated that between 500 and 600 health care workers whose jobs entail exposure to blood are hospitalized annually, with over 200 deaths per year from hepatitis-related illness. Health care costs for hepatitis B and related illnesses among health care workers are estimated at between $10 and $12 million dollars annually.

**HEPATITIS B VACCINE**

There are two types of prophylaxis against hepatitis B: hepatitis B vaccine and hepatitis B immune globulin (HBIG) which is prepared from plasma of infected persons and gives passive immunity.
The recombinant hepatitis B vaccine is made from yeast cells in a recombinant process. It is purified by both physical and chemical methods and has been tested for safety and efficacy in clinical trials with human subjects. It has been approved for use by the Food and Drug Administration. The vaccine is given in a series of three intramuscular doses (in the deltoid muscle) that induces an adequate antibody response in more than 90 percent of healthy adults. The second and third doses are given one month and six months, respectively, after the first.

Verifying immunity with pre- and/or post-vaccination blood draws is only recommended for high risk populations. The risk of acquiring HBV infection from occupational exposures is dependent on the frequency of percutaneous or permucosal exposures to blood or blood products. For persons who are infrequently exposed, a post-exposure blood draw is recommended to verify immunity.

Side effects from the vaccination may include a local reaction such as redness or tenderness at the injection site. A few people (3 to 5 percent) may experience a low grade fever, rash, nausea, joint pain, or mild fatigue. These reactions are infrequent and usually subside within 48 hours. No serious side effects have been reported with the vaccine, and there is no evidence that the vaccine has ever caused hepatitis B or any other disease. However, serious side effects may be identified with more extensive use. Prompt medical attention would be needed in the unlikely event of an allergic or more serious reaction.

The vaccine should not be taken during pregnancy. Certain types of vaccine should not be used if one is allergic to yeast or thimerosal.

C. Hepatitis C (Previously known as non A - non B)

Similar to hepatitis B in mode of transmission and in effect on the body. Fifty percent of those actually infected with hepatitis C can progress to chronic liver disease. Ten to twenty percent of such patients later may go on to develop cirrhosis or liver cancer.

1. **Infectious agent**: Hepatitis C Virus (HCV).
2. **Reservoir**: Human.
   
   **Incubation period**: 15 to 160 days.
   
   **Period of communicability**: Indefinite.
3. **Portal of exit**: Blood vessels, urethra and vagina.
4. **Means of transmission:**

   **Direct contact:** Blood, blood products, semen, vaginal secretions.  
   (Perhaps mother to newborn.)

   **Indirect contact:** Sharing contaminated needles and syringes.  
   Transfusions of blood, blood products. Accident skin puncture with 
   contaminated needle.

   **NOTE:** There is an ELISA test for HCV.

5. **Portal of entry:** Urethra, vagina, mucous membranes, broken (non-intact) skin, rectum.

6. **Susceptible host:** Anyone.

**Preventive measures:** Frequent, proper handwashing and use of "universal 
precautions."

D. **Hepatitis Delta (Viral hepatitis D, delta-associated hepatitis)**

An acute condition associated with hepatitis B infection. Hepatitis delta virus (HDV) and 
hepatitis B virus (HBV) may coinfect or delta virus infection may superimpose upon the 
HBV carrier state. In the latter case, delta hepatitis may be misdiagnosed as an 
exacerbation of hepatitis B.

1. **Infectious agent:** hepatitis delta virus (HDV is unable to infect a cell by itself; 
   requires coinfection with HBV)

2. **Reservoir:** Human beings, chimpanzees and woodchucks.

   **Incubation period:** Unknown in man.

   **Period of communicability:** Peak just prior to onset of acute illness.

3. **Portal of exit:** Urethra, vagina, blood vessels.

4. **Means of transmission:**

   **Direct contact:** With blood, blood products, fluids from open or draining 
   wounds, mucous membrane, saliva, exchange of infected semen, cervical 
   and vaginal secretions.
Indirect contact: Sharing contaminated needles and syringes. Accidental skin puncture with contaminated needle. Improperly sterilized equipment for ear piercing or tattooing.

NOTE: All blood products should be screened for evidence of HBV.

5. **Portal of entry**: Urethra, vagina, mucous membranes, broken (nonintact) skin, rectum.

6. **Susceptible host**: All persons susceptible to HBV or who are HBV carriers can be infected with HDV.

**Preventive measures**: Prevention of HBV infection prevents infection with HDV. HBIG, ISG, and HBV vaccines do not protect persons infected with the hepatitis B virus from infection by HDV.

E. **HEPATITIS E**

Hepatitis E (enterically transmitted non-A, non-B hepatitis; epidemic non-A, non-B; fecal-oral non-A, non-B hepatitis)

1. **Infectious agent**: Hepatitis A virus (HAV).

2. **Reservoir**: Human, chimpanzees (rarely); less frequently, certain other nonhuman primates.

   **Incubation period**: 15 to 64 days (average 26 to 42 days).

   **Period of communicability**: Not known.

3. **Portal of exit**: Anus (infected fecal particles).

4. **Means of transmission**:

   **Enteric (fecal-oral)**: Primarily ingestion of very small, contaminated fecal particles. Contaminated food and water. Uncooked shellfish.

   **Indirect contact**: Very rarely by the use of contaminated needles and syringes.

5. **Portal of entry**: Probably person to person by fecal-oral route.
6. **Susceptible host**: Unknown.

**Preventive measures**: Frequent, proper handwashing and use of "universal precautions."

**HIV DISEASE**

Human Immunodeficiency Virus disease is a term used to describe various conditions that may result from infection with HIV. HIV disease is described as a progression from HIV infection with no symptoms to AIDS.

AIDS (Acquired Immune Deficiency Syndrome), is a severe, life-threatening clinical condition, first recognized as a distinct syndrome in 1981. This syndrome represents the late clinical stage of infection with human immunodeficiency virus (HIV), which most often results in progressive damage to the immune and other organ systems, especially the central nervous system (CNS). Infected persons may be free of clinical signs or symptoms for many months to years before other clinical manifestations, including opportunistic infestations.

1. **Infectious agent**: Human Immunodeficiency Virus (HIV).

2. **Reservoir**: Human (symptomatic or asymptomatic).

   **Incubation period**: From a few weeks to over 10 years.

   **Period of communicability**: Once infected, always infectious.

3. **Portal of exit**: Broken skin; penis, anus, vagina and milk secretions of the female breast.

4. **Means of transmission**:

   **Direct contact**: With blood, fluids from open or draining wounds, mucous membranes. Exchange of infected semen, vaginal and cervical secretions.

   **Indirect contact**: Sharing contaminated needles and syringes. Accidental skin puncture with contaminated object.

5. **Portal of entry**: Anus, vagina, urethra, broken skin, mouth, eyes.
6. **Susceptible host:** Anyone.

**Preventive measures:** Alter behavior to prevent exposure to fluids or substances capable of transmitting HIV. Protection from needle punctures (sticks); wash hands frequently; limit exposure to blood (universal precautions).

**How HIV is Not Transmitted:** There is NO DOCUMENTED CASE OF TRANSMISSION of HIV by contact with an HIV-infected individual which did not involve exposure to blood, a body fluid visibly contaminated with blood, or the body fluids specified (sperm, vaginal secretions).

Centers for Disease Control research HAS NOT DOCUMENTED a single case of HIV being transmitted by these body fluids:

- feces
- nasal secretions
- saliva*
- sputum
- sweat
- tears
- urine
- vomit

Although no case of HIV Transmission has been linked to saliva, it is recommended that Universal Precautions be used in settings where saliva is likely to be contaminated with blood.

Saliva mixed with blood shall be treated as blood.

There is no documented evidence of transmission of HIV as a result of the following:

- breathing
- coughing
- dog bite
- food
- handshaking
- hugging
- human bite
- kissing
- sharing drinking glasses
- sharing eating utensils
- sneezing
- tears
- touching workplace objects (phones, door knobs, etc.)
- mosquito bite
- using the same toilet facilities

*Saliva has been shown to transmit Hepatitis A Virus and Hepatitis B Virus (involving a bit from individuals with poor oral hygiene), Influenza, Meningitis, and Tuberculosis.
IMPETIGO

A superficial bacterial infection of the skin, impetigo is especially contagious among infants and young children. It is characterized by blister-like lesions in the outer layers of the skin that progress to pus-filled blisters that form gummy, honey-colored crusts. Conditions such as anemia, malnutrition, poor hygiene and warm climates promote the development of impetigo.

1. **Infectious agent:**

   - **Nonbullous impetigo:** Beta-hemolytic streptococcus.
   - **Bullous impetigo:** staphylococcus aureus.

2. **Reservoir:** Human.

   - **Incubation period:** Usually 2 to 4 days.
   - **Period of communicability:** As long as lesions continue to drain, or the carrier state persists.

3. **Portal of exit:** Skin lesions of infected persons. Rarely nose or mouth.

4. **Means of transmission:**

   - **Direct contact:** With discharges from draining lesions.
   - **Indirect contact:** Touching articles freshly soiled with discharge from draining lesions and not washing hands prior to touching around mouth and nose.

5. **Portal of entry:** Broken (non-intact) skin, mucous membranes, mouth, nose.

6. **Susceptible host:** Anyone. Especially the young, elderly, or persons with compromised immune systems (the chronically ill, e.g., those with diabetes melitis, neoplastic disease, etc.).

**Preventive measures:** Frequent, proper handwashing; avoiding common use of toilet articles (bed linen, towels, washcloths); and prompt treatment of initial cases in children and families (universal precautions).
No immunization available. Reinfection possible. Notify school if school-aged child is infected.

**MALARIA**

Malaria is an acute, sometimes chronic, infectious disease caused by the presence of protozoan parasites in the red blood cells. Although it is generally considered a tropical disease endemic in Africa, Asia, and Central and South America, cases in the United States have been identified in refugee populations and military personnel returning from Southeast Asia. Although malaria is potentially fatal, it responds well to medical treatment. Chills, fever, headache, and muscle ache interspersed with periods of well-being are the typical manifestations of this disease.

1. **Infectious agent**: A protozoa.

   - **Plasmodium falciparum**: Most severe form of the disease.
   - **Plasmodium virax**.
   - **Plasmodium malariae**.
   - **Plasmodium ovale**.
   - **Plasmodium schwetzi**: Transmitted to man by this natural parasite of chimpanzee and gorilla vectors.

   **Plasmodium falciparum, virax, malariae, and ovale**: are transmitted to man by mosquito vectors.

2. **Reservoir**: Human.

   **Incubation period**:

   - Plasmodium falciparum, average 12 days.
   - Plasmodium virax, average 14 days.
   - Plasmodium ovale, average 14 days.
   - Plasmodium malariae, average 30 days.
   (All in temperate areas up to 8 to 10 months.)
**Period of communicability:** Mosquito infection: As long as the malaria protozoan, which reproduces in the human body, is present in the infected person’s blood. Highly varied according to species and strain.

3. **Portal of exit:** Oral cavity of female anopheles mosquito (usually insect bite).

4. **Means of transmission:**

   - **Vector-borne:** Bite of the infective female anopheles mosquito.
   - **Direct contact:** Mother to unborn child. Transfusion of contaminated blood and/or blood products.
   - **Indirect contact:** Use of contaminated needles and syringes.

5. **Portal of entry:** Break in the skin.

6. **Susceptible host:** Universal in humans, except in some Africans, who have a natural resistance.

**Preventive measures:** Application of insecticides where the anopheles mosquito lives. Installation of screens in endemic areas. Use of insect repellents and/or appropriate protective clothing. Use of medication to decrease susceptibility. Prevention of needlestick injuries.

Blood donor screening for history of malaria.

**MUMPS**

Mumps is an acute, infectious viral disease. Although the prognosis for mumps is good, complications can occur in sexually mature females and males. Mumps is characterized by loss of appetite, general discomfort and uneasiness, headache, fever (101 to 104 degrees F), earache which is aggravated by chewing, and swelling and tenderness of one or more of the salivary glands.

1. **Infectious agent:** Mumps virus.

2. **Reservoir:** Human.

   **Incubation period:** Approximately 2 to 3 weeks, most commonly about 18 days.
Period of communicability: Infectiousness is greatest approximately 48 hours before swelling occurs. The virus has been isolated in saliva as early as 6 days prior to salivary gland involvement, and as long as 9 days after salivary gland involvement. The virus has been isolated as long as 2 weeks prior to the onset of symptoms.

3. **Portal of exit**: Nose, mouth.

4. **Means of transmission**:
   - **Airborne**: Respiratory secretions (infected saliva, which has been aerosolized).
   - **Direct contact**: With saliva of infected persons.
   - **Droplet contact**: Touching infected saliva droplets and not washing hands and touching around nose and mouth.

5. **Portal of entry**: Nose, mouth.

6. **Susceptible host**: Anyone who has not developed immunity by either previous infection with the disease or through vaccination. By age group, children and young people seem most susceptible.

**Preventive measures**: Vaccination of infants and persons who have not had mumps (especially males), either approaching or past puberty.

Complications in males include testicular swelling, tenderness and redness of the scrotum, lower abdominal pain, nausea, vomiting, fever and chills. Sterility is extremely rare.

Complications in females include inflammation of the breast and inflammation of the ovaries.

Other potential complications include mumps meningitis, inflammation of the pancreas, deafness, inflammation of the joints, inflammation of the middle layer of the walls of the heart, inflammation of the brain, inflammation of sac covering the heart, and inflammation of the kidney.
PERTUSSIS (WHOOPING COUGH)

Pertussis is an acute, highly contagious, respiratory disease primarily affecting children under approximately 7 years of age. It is characterized by a repeated violent cough without intervening inhalation, followed by a distinctive crowing of high pitched inspiratory whoop, and the expulsion of large amounts of a very sticky mucous. Beginning immunization at three months can prevent the spread of infection in infants.

1. **Infectious agent**: Bordetella pertussis (a bacteria).

2. **Reservoir**: Human.

   - **Incubation period**: About 7 days, usually within 10 days, but not exceeding 21 days.

   - **Period of communicability**: From 7 days after exposure to 3 weeks after onset of periodic coughing attacks. Highly communicable prior to onset of cough.

3. **Portal of exit**: Mouth, nose.

4. **Means of transmission**:

   - **Airborne**: Aerosolized droplets from the respiratory tract (mucous membranes) of an infected person.

   - **Direct contact**: With discharges from the respiratory tract (mucous membranes) of an infected person.

5. **Portal of entry**: Mouth, nose.

6. **Susceptible host**: Susceptibility is general, especially affecting unimmunized children.

**Preventive measures**: Using caution when suctioning and providing oxygen therapy and airway management, immunization of children.

Pertussis vaccination does not provide complete and permanent immunity. The Diphtheria-Pertussis-Tetanus (DPT) vaccine is not usually given to persons 7 years of age or older since the disease is usually milder and reactions to the vaccine are more marked in older children and adults.
Rabies, the technical term for the disease commonly called hydrophobia, is an acute infection of the central nervous system. Rabies is transmitted to humans by the bite of infected animals and is almost always fatal if symptoms occur. Medical treatment prior to the onset of symptoms has been successful in preventing fatal central nervous system invasion.

1. **Infectious agent**: Rabies virus (rhabdovirus).

2. **Reservoir**: Many wild and domestic animals, including but not limited to bats, cattle, horses, dogs, cats, foxes, coyotes, wolves, skunks, raccoons and other biting animals, excluding rodents, rabbits and hares.

   **Incubation period**: Usually 2 to 8 weeks, occasionally as short as 10 days or as long as a year.

   **Period of communicability**: 3 to 5 days in dogs and most biting animals before the onset of signs, and during the course of the illness. Some wildlife species such as bats may be infectious for weeks before evidence of the illness is observed.

3. **Portal of exit**: Oral cavity of many wild and domestic animals (usually animal bites).

4. **Means of transmission**:

   **Vector-borne**: The virus-contaminated saliva of an infected animal.

5. **Portal of entry**: Breaks in the skin (usually as the result of an animal bite).

6. **Susceptible host**: Most warm blooded mammals. Natural immunity in man is unknown.

**Preventive measures**: Immunization of domestic animals (dogs and cats) and careful handling of strangely acting or possibly sick animals.

If bitten, try to obtain an animal immunization history and seek medical attention. If the animal must be destroyed in the field, do not shoot in the head, if possible. If domestic animal is involved, notify animal control; possible quarantine of animal in absence of immunization history.
**SALMONELLOSIS**

Salmonellosis is the correct name of an acute gastroenteritis commonly referred to as salmonella, or food poisoning. It is characterized by the sudden onset of abdominal pain, diarrhea, fever, nausea and sometimes vomiting. Salmonellosis is one of the most common infections in the United States.

1. **Infectious agent:** Gram negative bacilli of the genus salmonella. More than 1,400 species of salmonella have been classified.

2. **Reservoir:** Infected humans, domestic and wild animals, contaminated animal products.
   - **Incubation period:** 6 to 72 hours (usually 12 to 36 hours).
   - **Period of communicability:** During course of infection, varies from usually 3 days to 3 weeks. Chronic carriers known to be infectious for more than a year.

3. **Portal of exit:** Anus.

4. **Means of transmission:**
   - **Enteric (fecal-oral):** From person to person while diarrhea is present; ingestion of food or water contaminated with feces from an infected person or animal; uncooked eggs and egg products; meat and meat products; poultry; unsterilized pharmaceuticals of animal origin and raw milk.
   - **NOTE:** Very small, contaminated fecal particles are sufficient to cause transmission. Good hygiene and frequent, proper handwashing is the best defense.

5. **Portal of entry:** Mouth.

6. **Susceptible host:** Anyone, especially those who have a low level of free hydrochloric acid in the stomach due to antacid therapy, gastrointestinal surgery, neoplastic disease (cancer), immuno-suppressive therapy or other weakened physical conditions.
Preventive measures: Thorough cooking of all food stuffs, proper refrigeration and sanitary conditions (avoid cross-contamination) in food preparation areas, education of food handlers and persons preparing food. Properly washing hands after handling pets and before handling food. Exclude any person with diarrhea from handling food.

SYphilis

Syphilis is an acute or chronic, infectious, sexually transmitted disease that, if untreated, can progress to the development of blindness, heart disease, insanity, paralysis and death. With early detection and treatment, the prognosis for recovery is excellent.

1. Infectious agent: Treponema pallidum (a spirochete).

2. Reservoir: Human (asymptomatic or symptomatic).

   Incubation period: Varies from 10 days to 10 weeks, usually 3 weeks.

   Period of communicability: Variable and indefinite.


4. Means of transmission:

   Direct contact: With the infected discharge from early lesions, mucous membranes, body fluids and secretions (blood, saliva, semen, vaginal discharges) of infected persons. Typically, syphilis is transmitted through sexual intercourse. Infection of an open wound is possible, but rarely occurs. From mother to fetus in uterus.

   Indirect contact: Handling contaminated personal articles possible, but rare.

5. Portal of entry: Broken skin, or a mucous membrane (urethra, vagina).


Preventive measures: Promotion of general health measures, health and sex education.

No immunization. One attack does not confer immunity.
TETANUS (LOCKJAW)

An acute disease induced by an exotoxin of the tetanus bacillus, which grows anaerobically at the site of an injury. The disease is characterized by painful muscular contractions, primarily of the masseter and neck muscles, secondarily of trunk muscles. A common first sign suggestive of tetanus is abdominal rigidity, though rigidity is sometimes confined to the region of injury.

1. **Infectious agent**: Clostridium tetani, the tetanus bacillus.

2. **Reservoir**: Intestine of horses and other animals, including man, in which the organism is a harmless normal inhabitant. Soil or fomites contaminated with animal and human feces.

   **Incubation period**: Usually 3 to 21 days, although it may range from 1 day to several months, depending on the character, extent and location of the wound; average 10 days. Most cases occur within 14 days. In general, shorter incubation periods are associated with more heavily contaminated wounds, more severe disease and a worse prognosis.

   **Period of communicability**: Not directly transmitted from person to person.

3. **Portal of exit**: Feces (human and animal).

4. **Means of transmission**: Tetanus spores introduced into the body, usually through a puncture wound contaminated with soil, street dust or animal or human feces; through lacerations, burns and trivial or unnoticed wounds; or by injected contaminated street drugs. Tetanus occasionally follows surgical procedures. The presence of necrotic tissue and/or foreign bodies favors growth of the anaerobic pathogen. Cases have followed injuries considered too trivial for medical consultation.

5. **Portal of entry**: Broken skin.

6. **Susceptible host**: Anyone.

**Preventive measures**: Universal active immunization with adsorbed tetanus toxoid, which gives durable protection for at least 10 years; after the initial basic series has been completed, single booster doses elicit high levels of immunity. The toxoid is
generally administered together with diphtheria toxoid and pertussis vaccine as a triple (DTP) antigen (or double [DT] antigen for children under 7 years with contraindications to pertussis vaccine), or Td for older persons. In some countries, DTP, DT and TT are available combined with inactivated polio vaccine. There is no advantage to nonabsorbed ("plain") preparations, whether for primary immunization or booster shots. Reactions following tetanus toxoid injections are infrequent, but do occur, particularly after excessive numbers of prior doses have been given.

Even after receiving the basic series of three tetanus shots in the past, a Td (tetanus/diphtheria) booster is needed every 10 years to maintain protection. After a tetanus booster, another is not usually needed for 10 years. However, in the event of a puncture wound or a dirty wound, five or more years after the last booster, one should get another tetanus booster as part of wound treatment.

VALLEY FEVER (Coccidioidomycosis)

1. **Clinical Features:** Symptomatic infection (40% of cases) usually presents as flu-like illness with fever, cough, headaches, rash, and myalgias. Some patients fail to recover and develop chronic pulmonary infection or widespread disseminated infection (affecting meninges, soft tissues, joints, and bone). Severe pulmonary disease may develop in HIV-infected persons.

2. **Etiological Agent:** Coccidioides immittis.

3. **Reservoir:** Soil in semiarid areas (primarily in the Lower Sonoran life zone). Endemic in the south-western United States, parts of Mexico and South America.

4. **Incidence:** Incidence was 15 cases per 100,000 population in Arizona in 1995. Of persons living in areas with endemic disease, 10-50% are skin-test positive.

5. **Sequelae:** Meningitis may lead to permanent neurologic damage. Mortality is high in HIV-infected persons with diffuse lung disease.

6. **Transmission:** Inhalation of airborne arthroconidia after disturbance of contaminated soil by humans or natural disasters (e.g., dust storms and earthquakes).

7. **Risk Groups:** Persons in areas with endemic disease who have occupations exposing them to dust (e.g., construction or agricultural workers, and archeologists). High risk groups are African-Americans and Asians, pregnant women during the third trimester, and immunocompromised persons.
8. **Surveillance:** National surveillance through NETSS started in 1995. Reportable in states with endemic disease: California, New Mexico, Arizona.

9. **Challenges:** Developing an effective vaccine (vaccination offers the best prevention measure because infection provides life-long immunity). Identifying factors associated with increased risk for dissemination in select racial groups to target prevention efforts.

(Source: United States Centers for Disease Control and Prevention)

**QUESTIONS AND ANSWERS ABOUT VALLEY FEVER**

**What is Valley Fever and how common is it?**
Valley Fever can be a serious and sometimes deadly fungus infection. The Valley Fever fungus lives in soil and is spread, via spores, through the air. Spores are hardy forms of the fungus that can live for a long time in harsh environmental conditions such as heat, cold, and drought. Valley Fever usually affects the lungs. When it affects other parts of the body, it is called disseminated Valley Fever.

An estimated 50,000 to 100,000 persons develop symptoms of Valley Fever each year in the United States (U.S.), with an estimated 35,000 new infections per year in California alone.

**Where is Valley Fever found?**
It is found in limited areas of the southwestern U.S., Mexico, and parts of Central and South America that meet certain soil and climatic conditions. In California, it is found in many areas of the great Central Valley.

**How do people get Valley Fever?**
Valley Fever is spread through the air. The fungus spores get into the air when construction, natural disasters, or wind disturbs soil contaminated with the Valley Fever fungus. People breathe in the spores and then can get Valley Fever.

**What are the signs and symptoms of Valley Fever?**
About 60 percent of infected persons have no symptoms from infection by this fungus. The rest develop flu-like symptoms that can last a month. A small percentage of infected persons (<1%) develop disease that spreads outside the lungs to the brain, bone, and skin. Without proper treatment, Valley Fever can lead to severe pneumonia, meningitis, and Death.

**How is Valley Fever diagnosed?**
Valley Fever is diagnosed by an antibody blood test or culture.
Who is at risk for Valley Fever?

At highest risk for Valley Fever are farmers, construction workers, military personnel, archaeologists, and others who engage in activities that disturb the soil in the Central Valley where Valley Fever is common. People with weak immune systems, the elderly, African-Americans, Asians, and women in the third trimester of pregnancy are at increased risk for disseminated disease and can become seriously ill when infected. Anyone can get Valley Fever, but people who engage in activities that disturb the soil contaminated by the fungus are at increased risk. The disease is not spread from person to person.

Recent natural disasters have also triggered a rise in Valley Fever cases. The Central Valley of Southern California had a four-year epidemic of Valley Fever in the early 1990s after a severe drought. Cases of Valley Fever also increased in persons exposed to billowing dust released by the January 1994 earthquake in Northridge, California.

What is the treatment for Valley Fever?

Valley Fever is treatable with a variety of oral and injectable anti-fungal agents.

How can Valley Fever be prevented?

There is no vaccine against Valley Fever. Where it is safe and does not compromise fire or other emergency operations, persons at risk for Valley Fever should avoid exposure to dust and dry soil in areas where Valley Fever is common. All persons potentially exposed should be alert to the signs and symptoms of Valley Fever and seek immediate medical diagnosis and treatment if signs or symptoms appear.

(Source: California Department of Health Services)