Dr. Gessner’s Pocket Handbook of Infections, Infestations, Contagion and Pestilence

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FORWARD

No microbes were harmed in the writing of this book……..

P.E.T.M. (People for the Ethical Treatment of Microbes)

 Typically, when taking an introductory microbiology course, students are asked to learn about quite a few infectious diseases at the end of the book and the course. Textbooks often go into more detail that the beginning student can even comprehend. It is for this reason, and several others, that I had the idea to write this handbook of infectious diseases for my students. Here the student will have a place to look up and understand the most basic current information about infectious disease, cutting through the complex and often advanced information that just seems to get in the way of learning for the beginning student. The handbook is intended to allow the student to investigate infectious diseases throughout the course, at their own pace, by doing worksheets and working through case studies. This should allow the students to think of the pathogens of importance to human health throughout the semester.

 Nurses and other allied health professionals have several responsibilities to their patients. Medical workers need to deliver compassionate and competent care to their patients. They need to protect themselves and their patients from nosocomial diseases and be aware about how microbes spread, so that microbes aren’t brought home as “pets” to their family and friends. Finally, one often overlooked role for the health care professional is to be an advocate for and a teacher to their patients. Often, in a hassled and frazzled environment, the patient, in the hospital or doctor’s office, is bombarded with terms and procedures they are not trained to understand. When a diagnosis of infectious disease is made, the nurse is often the best source of basic information that can help the patient come to grips with the reality of their situation and can help the patient understand what having a specific infectious disease will mean to their lives. I hope that this handbook serves my students long after they graduate, so that it can be a quick reference guide to assisting their patients, with easy to understand basic information, for years to come in their practice of medicine.

 The handbook was initially inspired by Dr. E. L. Rhamstine, a mentor and colleague of mine at Valencia Community College in Orlando during the 1990’s. His earlier handbook was the reason I set out in trying to make my handbook even more valuable to my students. Through current research, by using easier to read descriptions and by adding a workbook to this book, I hope I have created an even better learning tool for my students. As with all medical research, the information in the handbook is current at the time the book is published but as time moves on, new information about infections is always being discovered. Students using the book should be using it as a quick reference guide supplemented with their own research if they want to find the most current and more detailed information about each infectious disease; quick notes about websites and more current information can be added to each page of the handbook. Using the computer, I would hope students would continue to be lifelong learners to offer their patients the best most up-to-date information available.

 It is to my students though that I hope my Handbook of Infection, Infestation, Contagion and Pestilence makes the learning of infectious diseases interesting and fun. As they graduate and move on to work in what I call the “den of infection, the crypt of contagion and the pit of pestilence,” I want my students to be safe in what is one of the deadliest places on earth- the hospital.

Acne

*Propionibacterium acnes*

Bacteria ubiquitous on human skin

Transmission via direct contact/fomites

Vaccine: NO

Tx: oral or topical antibiotics, benzoyl peroxide, Accutane

Reportable: NO

Diagnostics: None

Key Facts:

Also known as acne vulgaris, cystic acne, pimples, black heads or zits, acne appears to be due to a buildup of cells and sebaceous oil in hair follicles which clog the hair follicle pore forming what is called a “comedone” or plug which can result in an inflammatory response. Although acne is most common on the face, it can also occur anywhere on the body. Common misconceptions as to the cause of acne include stress, foods eaten (including chocolate, fried foods, nuts) and poor hygiene; all have no basis in scientific studies. Although common and most severe during adolescence (hormones may play a role in acne development), acne can occur at any age and appears to have a genetic component.

It is recommended that sufferers of acne wash their face gently only once or twice a day with a mild non-drying soap, that they not touch their face, not sunbathe, not squeeze pimples and not use oily cosmetics. Over-the-counter medications topically applied are often useful, but if not successful it is recommended that the sufferer seek the advice of a dermatologist. Oral and topical antibiotics as well as synthetic vitamin A derivatives such as the gel Retin-A may be prescribed. Accutane, once prescribed for the treatment of acne, was pulled from the market in 2009 by its manufacturer. It has been implicated as a teratogen and may cause inflammatory bowel disease (IBD) and suicide.

Notes:

African Sleeping Sickness

*Trypanosoma brucei gambiense (*West African Sleeping Sickness*)*

*Trypanosoma brucei rhodesiense (*East African Sleeping Sickness*)*

Protozoa (flagellated)

Transmission via tsetse flies (*Glossina* spp.)

Vaccine: NO

Tx: Is available, but must begin as soon as possible, in a hospital, after signs and symptoms appear

Reportable: NO

Diagnostics: The parasite is only observed through the examination of fluids from the site of the tsetse fly bite (chancre), blood, lymph nodes, bone marrow or cerebrospinal fluid

Key Facts:

 There are two types of African sleeping sickness, also known as trypanosomiasis. In East Africa, the *rhodesiense* subspecies exists; in West Africa, the *gambiense* subspecies exists and here the disease is also known as Gambian sleeping sickness. Both types of sleeping sickness are transmitted by the tsetse fly which is only found in Africa. The disease is zoonotic and is spread to humans after the tsetse fly bites wild mammals or cattle infected with the parasite.

 The tsetse bite is painful and results in a red lesion called a “chancre”. In the West African type of the disease signs and symptoms progress within weeks to months after the bite; death can take from months to years. In the East African type of the disease, signs and symptoms begin 1-4 weeks after the tsetse fly bite, and death is usually quicker, taking only weeks to months after the tsetse fly bite. As is typical with many insect transmitted diseases, signs and symptoms of both diseases include fever, headaches, rash, sore joints and muscles, swollen lymph nodes and fatigue. After the protozoan passes into the central nervous system, personality changes, confusion, lethargy, irritability, seizures, and difficulty talking, walking and concentrating can occur. Both diseases are fatal when left untreated. The disease is epidemic in some areas of Africa.

 There is no vaccine or prophylactic medicine to prevent the disease. Treatment is available if sought immediately once signs and symptoms occur. Reinfection can occur.

Notes:

Amoebic Dysentery

*Entamoeba histolytica*

Amoeba

Transmission via natural fresh water sources, feces

Vaccine: NO

Treatment: metronidazole (Flagyl)

Reportable: NO

Diagnostics: stool culture, ultrasound exam may aid in diagnosis

Key Facts:

 Also known as “bloody flux” and traveler’s dysentery, dysentery is characterized by a foul smelling bloody, mucousy diarrhea and is common in tropical climates. Sometimes, septicemia, fever, abdominal cramps, seizures and kidney failure can result from infection. Lactose intolerance can occur when infection is more long lasting. Contaminated water and food washed or irrigated with contaminated water as well as unwashed hands, especially from young children, are most commonly the source of amoebic dysentery. Free swimming amoeba are usually killed as they pass through the stomach, but the cyst form of the infection is resistant to stomach acid and when in the intestine the amoebic trophozoite stage burrows into the lower intestinal mucosa causing ulceration and bleeding. Rarely the amoeba can go through to the peritoneal cavity and spread to other organs, such as the liver. Symptoms can be from asymptomatic to life threatening and can persist until treatment is rendered; patients can be reinfected. Wild animals can harbor this microbe as can humans.

 When treating a patient with amoebic dysentery, take enteric precautions and wear gloves and be conscious to not come in contact with the feces. When visiting tropical foreign countries, precautions should be taken when ever drinking water or eating foods that come in contact with water. Sterilization of water is mandatory to avoid amoebic dysentery, and can be achieved by boiling water or using chemical tablets. Avoid salads, unpeeled fruit and ice cubes in beverages when the water source is not known to be potable.

Notes:

Amoebic Keratitis

*Acanthamoeba polyphaga, A. castellani and other Acanthamoeba species*

Amoeba

Transmission via environmental exposure or contact lenses

Vaccine: NO

Tx.: topical cationic antiseptics such as polyhexamethylene biguanide (0.02%) or chlorhexidine (0.02%),

 Propamidine isethionate (Brolene), therapy may last for months

Reportable: NO

Diagnostics: corneal scrapings for amoebic culture (may be false negative)

Key Facts:

 These amoebic species can be found in water, air and soil sources and is a potential cause of blindness when left untreated. As a cause of keratitis (infection of the cornea), the infection can occur even in healthy individuals, especially in contact lens wearers. Person to person transmission does not appear to be a problem. Signs and symptoms vary from individual to individual, but often include photophobia, eye pain and redness, tearing, blurred vision and the feeling that something is in the eye. Infections rarely occur in both eyes and the disease is often only diagnosed late in the course of the infection; typically misdiagnosed as bacterial, fungal or herpetic keratitis, the infection is consequently commonly mistreated especially when corticosteroids are prescribed.

 Although not common, most cases of Acanthamoeba keratitis in the United States occurs in contact lens wearers. Precautions that contact lens wearers should follow include: get regular eye exams and follow the directions for wearing and replacement of contact lenses; do not wear contact lenses when participating in activities that occur in any water environment; always wash hands with soap and water when handling contact lenses; use appropriate fresh cleaning and disinfecting solutions (never use saline or tap water) and make sure to dry out storage cases, which should be replaced often, between uses.

 Very rarely, Acanthamoeba infection can occur, typically in immunocompromised patients, where it causes Granulomatous Amoebic Encephalitis (GAE) or disseminated disease (where the skin and mucous membranes as well as other organs which can be infected). These infections are typically not a result of the keratitis form of the disease.

Notes:

Amoebic Meningoencephalitis

*Naegleria fowleri*

Amoeba

Transmission via warm water or soil

Vaccine: NO

Treatment: Amphotericin B (investigational drug)

Reportable: NO

Diagnostics: Direct microscopic examination of CSF; direct immunofluorescent antibody identification

Key Facts:

 *Naegleria fowleri* is the cause of acute primary amebic menigoencephalitis (PAM), in humans who typically have been swimming in warm water. Cases have been reported from swimming in hot springs, unchlorinated swimming pools and in lakes and rivers during the summer. PAM is not communicable and has been reported around the world, but incidence of the disease is rare. The amoeba enters through the nose, usually when swimming underwater or diving. The disease is rapidly fatal, typically progressing from severe headache, stiff neck, fever, and vomiting to signs of more severe neurologic involvement, coma and death within 3-7 days. Treatment has been successful in few cases since patients typically die before diagnosis is made.

Notes:

Anthrax

*Bacillus anthracis*

Bacteria

Transmission via inhalation, ingestion, or wound access of spores found in soil or from animals

Vaccine: YES (BioThrax)(typically for military personnel and those with occupational hazards)

Treatment: Antibiotics (Ciprofloxicin, Doxycycline, Penicillin), often for over 2 months

Reportable: YES

Diagnostics: Isolation of B. anthracis from blood, skin or respiratory sources, specific antibody tests from blood

Key Facts:

 Anthrax is a zoonotic infection of domesticated and wild ruminants, which infects humans through cutaneous, gastrointestinal or inhaled routes, all of which may be fatal. In the inhaled form, the disease is rapidly fatal within days after exposure and occurs upon exposure to spores which can lay dormant for decades in the soil or which come from exposure to infected animals or their products. The infection is not contagious from living humans, but can be acquired from dead humans and animals; therefore precautions must be followed when handling animal or human corpses. In the western world, due to animal vaccination, anthrax is very rare, but the bacterium has been used as a bioterrorist tool in the past.

 Cutaneous anthrax usually occurs through some break in the skin when handling animal products (Wool sorter’s disease) and appears at first as itchy bumps. The disease progresses to a painless ulcer with adjacent lymph node swelling and then the skin lesion turns black in the center. Intestinal anthrax occurs when eating contaminated meat and patients are febrile, nauseous, they vomit blood and have severe diarrhea.

 The most deadly form of anthrax, inhalation (or pulmonary) anthrax, begins with symptoms that resemble a cold, but within days, the patient has difficulty breathing and then goes into shock. Intravenous antibiotic therapy must begin when exposure is suspected; once signs and symptoms appear, the disease is usually fatal due to the toxins produced by the bacteria.

Notes:

Arboviral Encephalitis

St. Louis encephalitis, Eastern equine encephalitis, Western equine encephalitis,

 Venezuelan equine encephalitis, West Nile encephalitis, LaCrosse encephalitis and others

Virus (various virus families: St Louis and West Nile are flaviviruses; EEE, WEE and VEE are togaviruses)

Transmission: arthropod borne (arboviruses): mosquitoes and ticks

Vaccine: NO for humans (there are vaccines for horses)

Treatment: Symptomatic support therapy

Reportable: YES

Diagnostics: Spinal tap, serology

Key Facts:

 Encephalitis simply means an inflammation of the brain and can be due to many things including infections caused by many viruses and other microbes. The different types of arbovirus encephalitis are transmitted by mosquitoes and ticks. In the United States, St. Louis encephalitis is the most common mosquito transmitted form or the disease, but recently West Nile encephalitis has been more newsworthy. The infections mentioned here are all mosquito transmitted diseases. Encephalitis viruses are zoonotic and also infect other animals such as birds and horses. In all cases though, an arthropod transmits the disease; you cannot get the infection from birds and their meat and eggs, from horses, or from other people. Horses typically get vaccinated for the various types of equine encephalitis and West Nile encephalitis as a part of their routine vaccine schedule; there is no vaccine for humans.

 People with encephalitis can suffer from no signs and symptoms to mild flu-like symptoms that last a few days. Other people, especially the young, the elderly and the immunocompromised can suffer from more extreme symptoms such as sudden fever, severe headaches, stiff neck, nausea and vomiting, sleepiness, confusion and seizures; these symptoms can lead to coma and can be fatal if left untreated; long term memory loss as well as other neurologic symptoms can also occur when the brain swells and applies downward pressure on the brain stem.

 As with most viral infections, the body usually needs to eliminate the infection and supportive symptomatic therapy is needed; interferon therapy is currently being studied to improve the prognosis of patients with arboviral encephalitis. To prevent mosquito bites, use mosquito repellents, wear long sleeves shirts and long pants, and stay indoors from dusk to dawn.

Notes:

Bacillary Dysentery (Shigellosis)

*Shigella dysenteriae, Shigella sonnei, Shigella flexneri, Shigella boydii*

Bacteria

Transmission: Fecal-oral; food, water, person to person and fomites contaminated with human feces

Vaccine: NO

Treatment: Antibiotics

Reportable: YES

Diagnostics: Bacterial culture of stool

Key Facts:

 Bacillary dysentery is a highly contagious gastrointestinal disease that causes watery, bloody diarrhea which can contain mucus and pus. It is commonly referred to as shigellosis or “summer diarrhea” by some and is most often due to species of the genus *Shigella*, although other bacteria such as *Salmonella, Escherichia* and *Campylobacter* can cause similar symptoms. Shigella bacteria which cause dysentery produce shiga toxin that affects the intestines; of the different species of *Shigella*, one, *Shigella dysenteriae* type 1 (Sd1) produces the most severe epidemic outbreaks seen around the world. *Shigella sonnei* and *Shigella flexneri* are the most common types in the United States.

 Bacillary dysentery can be seen in patients, who have mild to severe diarrhea with blood and mucus, nausea, vomiting, abdominal cramps, painful bowel movements and fever. Symptoms can begin from 1 to 3 days after exposure to the bacterium which can come from another infected person, something that person touched or from food or water contaminated by human feces. Typically the disease lasts 3 to 7 days and resolves without treatment other than supportive therapy to replace lost fluids and electrolytes; in some instances dysentery has been known to be fatal, most commonly in the young, old and malnourished. Use of anti-diarrheal medications is not advised since this can keep the toxin producing bacteria in the patient’s intestines for a longer period of time. In cases which don’t resolve on their own, in young children or when the potential for epidemic spread exists (overcrowded areas where poor hygiene occurs), antibiotics have been used to treat bacillary dysentery; antibiotics can also shorten the carrier phase of the infection. Resistant strains have been known to appear rapidly so antibiotic use should be reserved these cases only. The bacteria can be shed for several weeks from infected patients so the clothes of infected patients should be washed in hot water, and hand washing must be practiced when contacting patients and fomites. People with shigellosis should wait until 2 days after the symptoms have stopped before going back to school or work, but they should wash their hands often; food handlers and people who work with children or the sick should get the approval of the local or state health department before returning to work.

 To prevent the spread of bacillary dysentery, proper hygiene is essential and human sewage must be properly disposed of. Minimal contact with infected patients should be observed and repeated hand washing should be practiced when around a patient with bacillary dysentery, do not share items used by patients with bacillary dysentery. Be cautious of food and water when in countries where food and water borne diarrheal diseases are known to exist.

Notes:

Botulism

*Clostridium botulinum*

Bacteria

Transmission is through exposure to spores in soil and certain foods

Vaccine: NO

Treatment: Antitoxin, assisted ventilation, induced vomiting, proper wound care

Reportable: YES

Diagnostics: Exclude other paralytic diseases, injection of blood or stool into mice

Key Facts:

 Botulism is a paralytic infectious disease caused by a spore forming bacterium. The disease typically occurs when eating certain foods but can also occur when the bacteria enter wounds. This anaerobic bacterium produces an exotoxin that blocks acetylcholine release from nerve endings resulting in respiratory and skeletal muscle paralysis. This same exotoxin, considered one of the most lethal toxins known, is used commercially, in a diluted form, under the name of Botox. Signs and symptoms of the disease include vision, speech and swallowing abnormalities which then proceed to muscle paralysis which appears from between 6 to 36 hours after eating poisoned foods. Treatment involves assisted ventilation using a respirator until the paralysis improves, which can take months and long term therapy may be needed even when off the respirator. Antitoxin can only be used early in the course of the infection, before the toxin attaches to nerve cells.

 In wound botulism, the spores enter a wound through breaks in the skin or through the umbilical cord. Recent cases have also been reported when patients have injected black-tar heroin. Signs and symptoms may be up to 10 days after exposure to the bacteria.

 Food borne botulism typically occurs when eating home-canned foods, although other foods, such as garlic oil infusions and baked potatoes have been implicated. When eating home canned foods, boil them for at least 10 minutes to destroy the toxins and never eat food from a bulging can.

 Infant botulism is the leading cause of botulism death in the United States but is not commonly fatal with medical intervention. It is a problem for infants under one year old since the bacteria can multiply in the intestines, with little competition from a normal intestinal flora, and produces the botulinum toxin. Honey and corn syrup should never be fed to infants under one year but most cases actually have no discovered cause.

Notes:

Brucellosis

*Brucella abortis (*cattle*); Brucella melitensis (*goats, sheep*) Brucella suis (*hogs*), Brucella canis (dogs)*

Bacteria

Transmission: Zoonotic infection from animals or animal products

Vaccine: YES (for farm animals, not for humans)

Treatment: Antibiotics (doxycycline and rifampin for weeks to months)

Reportable: YES

Diagnostics: Blood smear to look for microbe; serologic testing 2 weeks apart to look for antibodies

Key Facts:

 Also known as undulant fever, Bang’s disease, Malta fever and various other names, brucellosis is infrequently found in the United States but does occur more commonly around the world, especially where substandard veterinary and public health services are found. The disease typically is contracted by people who consume infected dairy products or whose jobs involve contact with animal products, such as slaughterhouse workers, meat packers and hunters. Transmission can be orally, parenterally or though inhalation. Although there is a vaccine in animals, there is none for humans.

 The disease commonly causes abortions in many vertebrates but in humans the disease causes flu like symptoms, which can lead to chronic recurring fevers and joint pain. Direct person to person transmission is rare, and requires body fluid contact. A general rule is to avoid unpasteurized dairy products and to use rubber gloves is you must contact animal viscera.

Notes:

Campylobacter food poisoning

*Campylobacter jejuni* (and occasionally other Campylobacter species)

Bacteria

Transmission: Fecal-oral

Vaccine: NO

Treatment: Usually self limiting when using fluid replacement, but severe cases may require antibiotics

Reportable: Doctors and labs are advised to contact local health officials

Diagnostics: Stool sample

Key Facts:

 Campylobacter is one of the most common causes of gastrointestinal illness in the United States and typically causes diarrhea (occasionally bloody), fever and cramping that usually can last a few days in duration. The disease can be accompanied by nausea and vomiting but is usually self-limiting. Rarely is the disease fatal and in some cases the disease is asymptomatic. In rare cases arthritis follows the infection and in others Guillain-Barre syndrome has been reported.

 Campylobacteriosis is a zoonotic infection that can be acquired from domestic and wild animals and found commonly on poultry bought in the supermarket. Infected chickens usually show no sign of infection. Basic rules to reduce the risk of acquiring the infection include proper cooking of food, such as chicken or beef, and the proper cleaning of hands and fomites when cooking food. Transmission can occur from young children, dogs or cats with diarrhea and from unpasteurized dairy products. Transmission can also be from water sources that are contaminated, whether from municipal or wilderness water sources.

Notes:

Candidiasis

*Candida albicans*

Fungus (yeast)

Transmission: contact, (this is a normal part of the human oral and vaginal flora)

Vaccine: NO

Treatment: Antifungal medications

Reportable: NO

Diagnostics: Direct microscopic observation and fungal culturing

Key Facts:

 The yeast *Candida albicans* causes both oropharyngeal (thrush) and vulvovaginal (vaginal yeast infection) candidiasis. The fungus is a part of the normal mucous membrane flora in most people, but causes disease when some imbalance of the normal microbial flora occurs.

 Oropharyngeal candidiasis is most common in newborns but can occur in patients who are immunosuppressed. Called “thrush”, oropharyngeal candidiasis appears as painless white patches (like cottage cheese) in the oral cavity and on the tongue. In HIV/AIDS patients the disease often affects the esophagus causing pain when swallowing.

 Vulvovaginal candidiasis (VVG) is common in females. Females typically have itching and burning of the vagina, sometimes with a cottage cheese discharge. Males infrequently can develop a sexually transmitted infection of the penis with an itchy rash. The condition is common in females when using broad spectrum antibiotic therapy, which destroys the native bacterial flora eliminating the yeast’s competition and causing an over growth. Other conditions that make a person more susceptible include pregnancy, diabetes mellitus, and steroid therapy. Oral antifungal medications and over the counter treatments for VVG are typically successful in treating Candida infections, but misdiagnosis when women self diagnose their infection can lead to resistant strains of the fungus, therefore it is best to be diagnosed by a medical doctor before treatment is attempted.

 Rarely, candidiasis can affect the penis, causing a painful rash on the penis or scrotum; the nail bed can also be infected.

Notes:

Cat Scratch Disease

*Bartonella henselae*

Bacteria

Transmission: Scratches and bites from cats.

Vaccine: NO

Treatment: Antibiotics can be prescribed but are often unnecessary.

Reportable: NO

Diagnostics: A history of cat scratches and bites in conjunction with a positive indirect fluorescent antibody blood test.

Key facts:

 Cat scratch disease (fever) is a disease for which historically it has been difficult to pinpoint an etiology. Cat scratch disease occurs most commonly in children, who have been bitten or scratched by kittens, but adult humans can be affected and adult cats can transmit the bacterium. The common signs and symptom include papules and pustules at the site where the bacteria enter the body and swollen lymph nodes in the upper arm and neck are often seen in about half of all patients approximately a week after the infection. In some patients, fatigue, fever, headache and loss of appetite also are found. Recovery in humans usually occurs with or without antibiotic therapy in about one month. In rare cases, *Bartonella henselae* can cause CNS, ocular and other organ involvement. Cats infected by the bacteria show no signs and symptoms. It appears cats clear the infection spontaneously and transmit the disease to each other through fleas.

 To prevent transmission of the disease it is recommended that flea control measures be taken. Children should avoid playing with kittens or cats when the play can lead to scratching or being bitten and cats should not be able to lick the wounds of a human. Declawing cats seems not to prevent the disease and when scratched or bitten by a cat, the wound should be washed thoroughly with soap and water.

Notes:

Chaga’s Disease

*Trypanosoma cruzi*

Protozoa (mastigophoran)

Transmission: Bite from the Reduvid (triatomine)(kissing) bug; foodborne; transplacental; breast milk (rare); blood transfusion and laboratory accident.

Vaccine: NONE for practical usage yet

Treatment: In the acute phase immediate antibiotic treatment is necessary; in the chronic phase symptomatic treatment is advised.

Reportable: NO

Diagnostics: Blood smears and cultures (for the acute phase) and ELISA test and various other immunodiagnostic tests are becoming available. Blood banks in Central and South America screen for the parasite in the blood.

Key Facts:

 Chaga’s disease, also known as American trypanosomiasis, is a disease of Central and South America, but is also seen in the United States due to immigrants from these regions. The disease is most commonly spread through the bite of the “kissing bug” (Family Reduviidae, subfamily Triatominae) a blood sucking insect that leaves its feces at the site of the wound; the feces is typically rubbed into the wound and the parasites then enter the bloodstream. The insects become infected by biting infected humans or animal reservoirs. Food borne, blood borne and maternal-fetal transmission are also possible.

 There are two phases to the disease, though some people remain asymptomatic. In the acute phase, signs and symptoms typical of many insect transmitted diseases appear (rash, fever, fatigue, body aches, swollen lymph nodes and spleen, vomiting and diarrhea). A swollen area where the insect bit the patient and a swollen eye lid on one side of the face (Romana’s sign) are also recognized signs. Treatment during the acute phase includes antiparasitic medications. In the chronic phase, which may appear up to decades after the infection, cardiac (enlarged heart and heart failure), intestinal (difficulty swallowing, enlarged esophagus or colon) and CNS complications can sometimes occur in an estimated 30% of untreated patients. Treatment during the chronic phase includes symptomatic care especially for patients with chronic heart disease.

 The disease is most commonly found in rural endemic regions of Central and South America, often in substandard housing and huts, where the insects hide during the day in the cracks, crevices and thatched or sugar cane roofs. Travelers planning on visiting these areas should bring insect repellant and wear protective clothing, use bed nets impregnated with insecticides and spray the environment with insecticides. It is preferred travelers sleep in well constructed, air conditioned hotels.

Notes:

Chancroid

*Haemophilus ducreyi*

Bacteria

Transmission: sexually transmitted

Vaccine: NO

Treatment: Antibiotics

Reportable: YES

Diagnostics: Bacterial culture

Key Facts:

 Chancroid is a sexually transmitted disease most commonly seen in tropical developing countries; the disease is infrequently seen in the United States. Typically the infection begins with a small swelling on the genitals that appears within 2 weeks of the infection and which progresses to a painful ulcer within a day. Uncircumcised men seem to be more at risk than circumcised men. In women, pain during urination is also common. In approximately 50% of the cases, the inguinal lymph nodes will swell and are painful (buboes); some of those patients will develop draining abscesses from these lymph nodes.

 Antibiotic treatment is very successful, but patients should also be checked for syphilis, HIV and herpes infections when presenting with Chancroid. Transmission can be through vaginal intercourse, oral sex, anal sex or mutual masturbation. Condoms and safe sex precautions help to limit the spread of the disease.

Notes:

Chicken Pox

Herpesviridae

Varicella-Zoster virus (VZV), (human herpes virus 3 = HHV-3)

Transmission : Respiratory droplets or contact with secretions from chicken pox or shingles

Vaccine: YES (there is a vaccine for chicken pox usually given to children as well as a vaccine recommended in people over 60 to protect them from developing shingles)

Treatment: Symptomatic, occasionally acyclovir in cases with complications.

Reportable: NO

Diagnostics: Although not usually necessary to test in children, there are many serologic tests which test for antibodies.

Key Facts:

 Chicken pox (varicella) is a highly contagious primary infection usually of children for whom there has been a vaccine (Viravax and MMRV), in the United States, since 1995. Humans are the only reservoir of the virus, spreading it through nasal and oral secretions or by coming in contact with the fluid from the skin lesions of chicken pox or shingles. Initial infections with the virus result in chicken pox, but a latent infection can occur in some patients. Although infection with the virus typically provides lifelong protection from developing chicken pox again, the virus can remain dormant in sensory nerve cell ganglia and reappear decades after the initial infection as localized painful skin eruptions known as shingles (herpes zoster). Since 2006, a vaccine to prevent the occurrence of shingles (Zostavax) has been available and approved for adults over 60. Shingles may also result in patients suffering from extended periods of time with pain due to post-herpetic neuralgia after the lesions clear.

 The disease is usually mild and self limiting in children, who often present with fever, malaise and the appearance of an itchy rash with fluid filled vesicles which eventually crust over. The vesicles occur most commonly on the head and trunk and often appear in several waves that last usually 4-5 days. The incubation period for chicken pox is usually approximately 2 weeks and children are considered contagious from 2 days before the rash appears until the last vesicles crust over; the crusts are not considered contagious. Usually children recover with symptomatic care, the use of acetaminophen (never aspirin, which can result in Reye’s syndrome) and anti-itch topical medications.

 Although usually not considered a serious disease in children, in pregnant women who acquire an infection during the first 20 weeks of pregnancy there may be complications in the unborn child’s development. Mothers who acquire an infection at the time of delivery (from 5 days before to 2 days after delivery) also may transmit the infection to their newborn, which also may have consequences. Typically maternal antibodies passed through the placenta and breast milk protect the unborn and newborn child in women who have had chicken pox before their pregnancy and woman who develops shingles during pregnancy will not infect the unborn child. Immuno-compromised patients also show increased risk of developing potentially fatal consequences due to infection with the virus.

Notes:

Chlamydia

*Chlamydia trachomatis*

Bacteria

Transmission: Sexually transmitted

Vaccine: NO

Treatment: Antibiotics

Reportable: YES

Diagnostics: Nucleic Acid Amplification Tests on exudate or urine.

Key facts:

 Chlamydia, also known as non-gonococcal urethritis due to its tendency to mimic gonorrhea, is one of the most common sexually transmitted diseases in the world. Most people have no idea they are infected with the bacterium and in women the consequences are typically more severe than in men. As with gonorrhea, the infection can be spread thru vaginal, anal or oral sex and in some men there may be a purulent discharge from the penis and painful urination. In men long term consequences and sterility is rare. Use of a condom is recommended to decrease the chances of developing the infection. In females, especially when young, there is more often a chance of signs and symptoms ranging from a vaginal discharge to painful urination and if the bacteria spread to the oviducts, there is a chance of developing pelvic inflammatory disease (PID) and the consequences associated with PID, such as infertility and ectopic pregnancy.

 The bacterium also can cause an eye infection (trachoma), especially in newborns delivered vaginally to an infected mother, which is one of the most preventable causes of blindness, worldwide. Antibiotics are readily available to treat infected patients and antibiotic eye drops can prevent chlamydial conjunctivitis and blindness in newborns. Pregnant women and sexually active women under 25 should be screened for Chlamydia. Rare cases of arthritis may also be a long term problem after infection with Chlamydia.

Notes:

Cholera

*Vibrio cholera*

Bacteria

Transmission: Fecal-oral

Vaccine: YES (not available in the United States)

Treatment: Oral electrolyte therapy, antibiotics

Reportable: YES

Diagnostics: Culture bacteria from stool samples, Rapid Cholera Dipstick test

Key Facts:

 Cholera is a rapid onset diarrheal disease transmitted by drinking from water sources contaminated by human feces and by eating foods exposed to that water. Historically, many famous people have died from cholera including Peter Tchaikovsky and U.S. president James K. Polk. The disease has been essentially eliminated in the United States and in Europe due to proper handling of sewage and modern water treatment facilities, however in underdeveloped parts of the world, cholera epidemics still occur. The bacterium produces an enterotoxin which causes some people to have profuse watery diarrhea (called “rice water” stools due to the clear nature of the diarrhea which contains flecks of mucosa). The diarrhea typically occurs from one to five days after exposure to the bacteria (for some unknown reason, people with type O blood are at much high risk), although most people have no or minimal signs and symptoms while shedding the bacterium in their feces for a couple of weeks without knowing they have been infected. For people most affected by the enterotoxin, extreme diarrhea, nausea, vomiting, muscle cramps and dehydration occur. In these patients massive electrolyte loss, shock and death can occur within hours.

 The infection and disease is easily treated. Immediately treat patients with an oral electrolyte solution (salt and sugar in water) in a volume equal to the loss of water through diarrhea. In some cases, antibiotics can shorten the course of diarrhea. To prevent getting cholera, in endemic areas, there is a saying: boil it, cook it, and peel it. When traveling to a country known to have cholera, drink only boiled, bottled or chlorinated water, never eat raw vegetables or seafood and only eat foods that are cooked or that you can peel. Unfortunately, this is often a disease seen in areas where war, natural disasters and poverty are seen and therefore these people often are often not able to get immediate medical care.

Notes:

Clostridium difficile (C. diff) Colitis

*Clostridium difficile*

Bacteria

Transmission: Fecal-oral

Vaccine: NO

Treatment: Flagyl (metronidazole) or Vancomycin

Reportable: NO

Diagnostics: Test for *C. difficile* toxins in stool samples

Key facts:

 *Clostridium difficile*, also known as C. diff, is an increasingly common nosocomial intestinal disorder usually due to antibiotic therapy which eliminates many of the normal microbes of the intestinal flora but not this spore forming bacterium; repeated enemas are also implicated in causing the disease. It causes a watery, foul smelling diarrhea and in severe cases causes fever, abdominal pain, bloody diarrhea and pseudo membranous colitis. In extremely severe cases, the disease can be fatal. The disease has been most commonly seen in hospitals, convalescence and nursing homes and in nurseries but recently there are increasing numbers of cases arising from outside these facilities, in outpatient cases.

 The spores of the bacterium are commonly found throughout hospital and nursing home environments and the spores can persist in the environment for several months. Bleach appears to work well at killing the spores; some disinfectants do not kill the spores. People (most commonly babies and young children) and pets can be asymptomatic carriers of the bacteria. The longer a patient stays in a medical facility the greater is their chances of acquiring the infection. It is critical for health care providers to wash their hands between seeing patients to prevent the spread of the disease. Proper elimination of human waste, including diapers, and careful disinfection of fomites is also necessary.

 Not all cases of antibiotic related colitis are caused by *Clostridium difficile*, but once the disease is diagnosed, previous antibiotic therapy should be stopped and appropriate anti-clostridium antibiotics should be prescribed. Diagnosis commonly involves testing stool samples for the presence of toxins; an endoscopic exam is often performed to detect the pseudo membranes in colon. If needed, supportive fluid therapy should be given to correct dehydration and electrolyte imbalances. Since the bacterium is a spore former, relapses can occur even after appropriate treatment.

Notes:

Coccidioidomycosis

*Coccidioides immitis*

Fungus

Transmission: Inhalation of fungal spores

Vaccine: NO

Treatment: Antifungal medications (amphotericin B, ketoconazole) for chronic or severe cases

Reportable: YES

Diagnostics: Culture and lab identification (BSL-3 organism), sputum KOH, skin test

Key Facts:

 Coccidioidomycosis is an airborne fungal infection acquired by breathing in the spores of the fungus. Also called Valley fever, San Joaquin Valley fever and California valley fever, it is most common in the desert southwest of the United States as well as in some areas of Central and South America. The disease can infect dogs and other mammals but it is not transmitted by animals or people, it is through environmental exposure to the spores that infection occurs. Infection is most likely on dry windy days, as the spores resist drying out.

 Most people infected by the spores are asymptomatic. In other patients there are 3 forms of the disease, an acute form, a chronic or severe form and a disseminated form. In the acute phase of the infection, patients may have mild pulmonary signs and symptoms. The incubation period is 1-3 weeks and usually the mild influenza-like symptoms do not require treatment and recovery is usually complete. In some patients the disease progresses to a more chronic form which can affect the lungs forming abscesses even years after the initial infection. Treatment during this phase is usually successful. In other cases, especially in immune-compromised patients, disseminated Coccidioidomycosis can occur in the bones, CNS, heart, and lungs and less frequently in other organs. Meningitis is a common cause of death in these patients with disseminated disease; there is a high death rate.

Notes:

Colds

Rhinoviruses and Corona viruses (most common causes)

Viruses (estimated 200-250 different cold viruses are recognized)

Transmission: Respiratory, fomites

Vaccine: NO

Treatment: Symptomatic therapy

Reportable: NO

Diagnostics: Diagnosed typically by signs and symptoms

Key Facts:

 The common cold is one of the most recognizable diseases of humans for good reason, it is very common and is one of the most given excuses for missing school and work. It is estimated that there are over 200-250 different cold viruses (most, but not all, caused by rhinoviruses and corona viruses) that cause an infection of the upper respiratory tract; most people get at least one cold each year, with children typically getting more colds than adults. Often beginning with a sore scratchy throat or irritated nose, people suffering from a cold develop a runny and stuffed up nose and they sneeze; in young children, sometimes a low to mild grade fever can also occur. It takes from a couple of days to a week after being infected with a cold virus to come down with the signs and symptoms typical of the cold. Colds are spread by breathing air which contains cold viruses that come from other people sneezing, coughing, talking or laughing; people also get colds by touching a fomite, which was contaminated with cold viruses, and then touching their eyes, nose or mouth. The old myth that you get a cold because you are chilled and wet or in a draft is a myth, the only way to get a cold is to be exposed to a cold virus; so by being chilled and wet you may put a stress on your immune system, but that won’t cause a cold.

 When you get a cold, you may also cough, get a sore throat, ache and have a decreased appetite. Many people have a thick nasal discharge that starts out clear but becomes yellow or green; this is normal. Colds, being caused by viruses are NOT treatable using antibiotics and it has also become controversial as to whether cough suppressants are advised. There is no cure for the common cold, but your immune system should help you fight off the viral infection. Symptomatic supportive therapy, including rest, drinking plenty of fluids (especially warm fluids such as chicken soup), increased humidity and taking decongestants are all recommended and although they don’t cure the cold any faster, they can help to make the patient feel better. People with colds are most contagious during the first few days of having a cold and the typical cold lasts about a week. If you have signs and symptoms that don’t get better or get worse after a week or if you have other respiratory diseases, the problem should be addressed by a physician. There is no vaccination for the common cold due to the large number of different viruses that cause the cold so your best bet to avoid getting sick from a cold is to get plenty of rest, drink plenty of fluids to hydrate your mucous membranes, use hand sanitizers and wash your hands frequently, disinfect fomites and use paper towels.

Notes:

Cryptosporidium Enteritis

*Cryptosporidium parvum*

Protozoa (sporozoan)

Transmission: Fecal-oral

Vaccine: NO

Treatment: No reliable treatment as infection is usually self limiting, water sources need to be treated to ensure public health safety.

Reportable: YES

Diagnostics: Stool culture and staining; serologic DNA based tests are becoming available.

Key Facts:

 Cryptosporidiosis is an intestinal disease, typically acquired from human feces or from food or water that is contaminated by human feces. Cattle also seem to be a source of the infection, but transmission from household pets appears to be rare. In healthy individuals, the disease manifests itself with signs of abdominal distress; watery diarrhea, nausea, vomiting, cramps and low grade fever. In these patients, the disease lasts 1-2 weeks and recovery is complete with only symptomatic treatment for the water lost through diarrhea. Immuno-compromised patients usually have a more severe abdominal signs and symptoms when infected and in rare cases can die from the infection.

 One source of infection by Cryptosporidium is from drinking water and even municipal drinking water sources have been the source of outbreaks. The protozoan produces oocysts that resist chlorination. Boiling water and use of ultra filtration are the recommended ways to reduce the risk of acquiring the infection from drinking water.

Notes:

Cyclosporidiosis

*Cyclospora cayetanensis*

Protozoa

Transmission: Fecal-oral

Vaccine: NO

Treatment:

Reportable: YES

Diagnostics: Physician needs to request specific tests and several successive stool samples maybe needed.

Key Facts:

 Cyclosporidiosis is an emerging intestinal disease that occurs worldwide, and although not common, cases are increasing in the United States and Canada. Many patients suffer watery diarrhea that may be explosive, as well as bloating, loss of appetite, fatigue and low grade fever. The infection occurs when a person ingests water or food that is contaminated by feces from another infected person. Interestingly, the protozoan parasite isn’t spread from person to person, since it takes approximately one week before the microbe becomes infectious from the time it is passed in the fecal material. The incubation period is approximately one week after ingesting the parasite and diagnosis can be difficult; health care providers need to specifically request tests to diagnose the infection. Treatment involves giving trimethoprim-sulfamethoxazole; untreated, the disease can last for up to a month and relapses can occur.

Notes:

Cytomegalovirus

Herpesviridae

Herpes virus- Human Herpes Virus 5 (HHV-5)

Transmission: Contact with body fluids

Vaccine: NO

Treatment: CMV-immune globulin, Ganciclovir (for life threatening cases)

Reportable: NO

Diagnostics: Body fluid culture, Antibody titer to detect virus

Key Facts:

 Cytomegalovirus (CMV) is a latent herpes virus infection that most people have in their bodies due to an asymptomatic infection that usually occurred at some point during their childhood. The virus is virtually ubiquitous, can cross through the placenta and is commonly acquired by coming into contact with human body secretions, even from asymptomatic carriers. At this time there is no treatment for this infection unless the infection is life threatening. Most people infected either will never know they were infected or the infection was so mild, it resembled a mild case of mononucleosis. In two groups of people though, cytomegalovirus infection can be life threatening. In some pregnancies, the unborn or newborn baby can be infected and this can lead to mental retardation and less commonly to hearing defects and blindness. Pregnant mothers should consult their doctor to understand their risks of getting a CMV infection and, once their babies are born, breastfeeding from CMV positive mothers should continue. In patients who receive organ transplants and in patients with other reasons to cause a weakened immune system (cancer chemotherapy, HIV patients, etc.), the virus can be life threatening and a cause of blindness. In these cases, CMV-immunoglobulin and ganciclovir may help fight the infection.

Notes:

Dengue Fever

Flavivirus

Virus

Transmission: Mosquito vector (*Aedes aegypti*) or blood exchange

Vaccine: NO

Treatment: Rehydration, acetaminophen (Tylenol) (NEVER ASPIRIN)

Reportable: NO

Diagnostics: CBC, serologic titer tests

Key Facts:

 Dengue fever (DF) is a mosquito vectored disease found primarily in tropical and subtropical areas of the world, but cases can be found anywhere due to increased world travel; an estimated 100 million cases occur annually. The *Aedes aegypti* mosquito is the primary vector of four separate serotypes of the virus, in the family Flavivirus, which cause the disease. Also known as break-bone fever, patients with dengue fever have various aches of their muscles and bones; typically they have a flat, red generalized body rash and a high fever that appears during the early onset of the disease. There can be a second rash during the end of the disease. The disease lasts about a week and is also accompanied by headaches and on some occasions can involve the gastrointestinal tract and lead to nausea, vomiting and melena in the stools. The prognosis is good for patients who have only one serotype of the disease. The dehydration that results from the infection can be stabilized with electrolyte fluid therapy and the pain should be addressed by using acetaminophen and never aspirin.

 Because there are different serotypes of the virus which cause dengue fever, humans can be re-infected with the disease if they acquire a different serotype. If a patient becomes infected with a second serotype, a more serious consequence known as dengue hemorrhagic fever (DHF) can lead to shock and death. There is no current vaccine for this disease, but promising vaccines are under study. Mosquito control programs in areas where dengue fever is common often seem to get little funding, so travelers to tropical and subtropical areas of the world should bring mosquito repellent (DEET), bed nets and protective clothing.

Notes:

Dental caries

*Streptococcus mutans, Lactobacillus acidophilus* (others implicated)

Bacteria

Transmission: Contact, microbes are part of the normal flora early in life

Vaccine: NO

Treatment: Restoration (fillings, crowns, root canal), tooth extraction

Reportable: NO

Diagnostics: Dental explorer and radiographs

Key Facts:

 Dental caries is the term used for the infection of teeth that leads to the demineralization of the tooth enamel and the formation of a hole or cavity; today, many people use the term dental caries and cavities as synonyms. Almost as common as the cold, dental caries affect almost every human on earth at some point in their life. Bacteria, such as *Streptococcus mutans*, use the sucrose (table sugar) in our diet and produce a sticky substance that adheres to tooth enamel and causes plaque. As the plague hardens it is called tartar; tartar can lead to gingivitis and periodontitis. If the plaque isn’t quickly removed, *Streptococcus mutans* and *Lactobacillus acidophilus* colonize and ferment sugars, such as glucose, fructose and sucrose, in our diet to produce lactic acid. This lactic acid demineralizes the tooth enamel leading eventually to formation of pits in the enamel called cavities. Early in the course of the disease, there is no pain, but a chalky white mark appears on the enamel. A dentist can detect a softening in the tooth enamel using a dental explorer and can detect difficult to see cavities by taking tooth X-rays. As tooth damage progresses, toothaches and tooth sensitivity signal that damage is happening deeper in the tooth; tooth root abscesses may then occur.

 Once damaged, the tooth does not grow back, but treatment involving fillings and crowns can help to stop the spread of the damage and restore the function of the tooth. To prevent dental caries from forming, good dental hygiene is encouraged: professional teeth cleanings every 6 months, twice daily tooth brushing, daily flossing and annual X-rays are all recommended. Dental sealants and fluoride help to decrease dental caries. Sugary beverages and sticky carbohydrate laden foods should be kept to a minimum and if they are a part of the diet, rinsing the mouth and tooth brushing immediately after consumption is recommended.

Notes:

Diphtheria

[*Corynebacterium diphtheriae*](http://en.wikipedia.org/wiki/Corynebacterium_diphtheriae)

Bacteria

Transmission: Respiratory droplets, physical contact

Vaccine: YES (DTaP, DPT, Td)

Treatment: Antitoxin, antibiotics, supportive treatment

Reportable: YES

Diagnostics: Throat culture

Key Facts:

 Diphtheria used to be a common respiratory disease that caused the death of children by forming a toxin and a tough leathery membrane across the back of the throat that lead to suffocation. Historically, it was the race to ship diphtheria anti-toxin to Nome, Alaska during a diphtheria epidemic that was the inspiration for the Iditarod dog sled race. Today, diphtheria is a very rare disease in developed countries due to the development of a vaccine; the DTaP (Diphtheria, Tetanus and acellular Pertussis) vaccine is a regularly scheduled for children. The disease is most commonly spread by respiratory droplets, but can also be found on fomites and in foods, like milk. The disease has an incubation period of 2-5 days, after which a tough, grayish black covering forms in the back of the throat and the neck can look swollen. Patients often have a sore throat, painful swallowing, difficulty breathing and fever. Toxins produced by the bacterium spread through the circulatory system and can cause heart and kidney damage and temporary paralysis. The bacterium, if it enters through the skin, can cause skin lesions.

 Diagnosis is commonly through the physical exam, but throat culturing can be used to definitively diagnose the disease. If diphtheria is suspected, there is no time to lose and diphtheria anti-toxin must be administered, antibiotics should be given and patients may need supportive breathing therapy, monitoring of heart function, IV fluids and rest. All people exposed to the patient should make sure their diphtheria vaccine is current. The vaccine lasts only 10 years so a booster shot maybe necessary. A tetanus-diphtheria (Td) vaccine is advised for adults every ten years. Carriers of diphtheria should be treated with antibiotics.

Notes:

Ebola Virus

Filovirus

Virus

Transmission: Person to person or animal to person contact

Vaccine: NO

Treatment: Supportive treatment of symptoms

Reportable: NO (In Africa, public health officials should be notified)

Diagnostics: ELISA, PCR and virus isolation

Key Facts:

 Ebola virus is a rare but often fatal disease, found in Africa that can affect humans and non human primates, such as gorillas, chimpanzees and monkeys. Also called Ebola Hemorrhagic Fever (Ebola HF), the disease has been the subject of the movie, Outbreak, and the word Ebola often brings fear of the disease due to its high fatality rate and the way patients die from the disease. A Biosafety Level 4 microbe and potential bioterrorist tool, the virus has an incubation period of between 2 to 21 days and causes an acute infection. Patients initially suffer from flu-like symptoms but soon have diarrhea and vomiting. Late in the disease, internal and external hemorrhaging may occur, with conjunctivitis, bleeding from the eyes, ears, mouth and rectum and a generalized hemorrhagic rash present. The genitals and skin may swell and be painful. Ultimately, between 80-90% of patients die from shock and bleeding abnormalities.

 There is no known reservoir of the Ebola virus, although it is suspected that the disease is zoonotic, possibly spread from wild primates. It has been suspected that the reservoir of the disease may be fruit bats. Once infected, the disease can spread when other people are exposed to the blood or other body secretions of the patient. Protective barriers (gloves, masks, gowns, and goggles) should be worn when treating patients with Ebola HF and local health officials should be notified if the disease is suspected. The disease is often nosocomial in African hospitals, so isolation of patients and their body fluids must be observed, and medical equipment must be sterilized. Deceased patients should not be directly touched without some barrier protection. There is no known treatment for the infection, but supportive therapy, to treat electrolyte and circulatory system abnormalities, is suggested. There has been a vaccine produced for wild animals, but a vaccine for humans is still in research.

 In 2007, an outbreak in the Democratic Republic of Congo occurred most recently, but the disease is so sporadic that when cases do occur, they are quickly isolated and contained. The picture have of patients suffering from organs liquefying and blood spurting from body orifices is a myth, although internal and external bleeding do occur and the disease is usually fatal.

Notes:

Ehrlichiosis

*Ehrlichia chaffeensis, Ehrlichia* ewingii, E. phagocytophila

Bacteria (rickettsia)

Transmission: Tick borne

Vaccine: NO

Treatment: Antibiotics

Reportable: YES

Diagnostics: Blood smears, IFA tests (these are often difficult to interpret in many patients)

Key Facts:

 Ehrlichiosis is a relatively recent pathogen discovered in humans, first appearing in the 1980’s. There are three suspected species that affect humans in the United States. Other species of *Ehrlichia* have been seen in many types of animals, including dogs, cattle and horses. In humans, there appear to be two diseases caused by *Ehrlichia,* human monocytic ehrlichiosis (HME) which is caused by *Ehrlichia chaffeensis* and human granulocytic Ehrlichiosis (HGE) which is caused by a newly recognized *Ehrlichia*. The vector that spreads the disease is the tick; the lone star tick spreads HME primarily in the south and southeastern states, while the black legged tick appears to spread HGE primarily in the northeast, upper Midwest and in the pacific coast states.

 Typically between 5-10 days after being bitten by a tick, patients develop a high fever with head and muscle aches. A generalized body rash and arthritic symptoms generally do not occur in most patients; some children will develop a rash but the disease appears to be more common in adults. Many people infected with Ehrlichia appear to have mild or no symptoms, but in sick patients, elevated liver enzymes and a low white cell count and low platelet count are common. Laboratory testing for the disease is dependent upon the lab you have available, consultation with the lab in conjunction with the signs and symptoms of the disease must be taken into consideration when reading the serologic tests to diagnose ehrlichial diseases. In some cases, Ehrlichiosis can be a fatal disease, causing renal failure, seizures and coma, and therefore antibiotic treatment with doxycycline is advisable.

 On way to prevent acquiring tick borne diseases is to take certain precautions when going outdoors: wear light colored long sleeve shirts and long pants that you tuck into your socks, use insecticides that contain DEET (not 100% effective in killing or repelling ticks) on the skin and permethrins on clothing, and do a body check when coming indoors. To remove a tick from the skin, use TWEEZERS to grab the head and pull straight out from the skin. (Do not use a match, cigarette or Vaseline).

Notes:

Enterococcus Infections

*Enterococcus faecalis, Enterococcus faecium*

Bacteria

Transmission: Person to person and fomites contaminated with human feces

Vaccine: NO

Treatment: Antibiotics (VRE resistant strains are becoming more common, sensitivity tests are needed)

Reportable: NO

Diagnostics: Bacterial culture with rapid typing testing

Key Facts:

 Enterococci are a normal member of the human intestinal flora; they are typically harmless bacteria that can cause urinary tract infections, wound infections and systemic infections for hospital patients with underlying diseases. In the past, the bacteria were classified as group D Streptococci (Lancefield system), but they have been reclassified. Enterococci are now used as one of the more common tests for fecal contamination, especially in recreational and salt water.

 Enterococci do not cause infections in healthy individuals but are a problem for patients receiving in-hospital care, especially when proper hand washing practices and infection control measures are not observed. Vancomycin resistant strains of Enterococci (VRE’s) have become more of a nosocomial problem recently in hospitals and nursing homes. VRE’s aren’t usually more harmful than other Enterococcus infections, but they are resistant to one of the best antibiotics used to treat Enterococcus infections- vancomycin. Patients located near VRE infected patients are usually at higher risk for acquiring these resistant strains of the bacterium. New antibiotics are being researched to treat patients with VRE’s. People providing health care need to properly glove and wash their hands when caring for a patient with a VRE infection, and gowns are recommended when coming in direct contact with a VRE patient. Hospital environment disinfection with bleach or other approved disinfectants and medical equipment disinfection with iodine, 70% ethanol, 2% glutaraldehyde or with formaldehyde needs to be stressed in a VRE patient’s room. At home, normal cleaning procedures of household fomites will suffice. Patients who have extended stays increase their risk of developing VRE infections each day they are in the hospital. When VRE’s become blood borne infections, they can occasionally lead to death in the patient.

Notes:

E. coli O157:H7

*Escherichia coli*

Bacteria

Transmission: Fecal-oral

Vaccine: NO

Treatment: Supportive fluid therapy unless Hemolytic Uremic Syndrome (HUS) occurs.

Reportable: YES (Shiga toxin-producing *E. coli* (STEC) and post-diarrheal Hemolytic uremic syndrome are both reportable)

Diagnostics: Bacterial culture on sorbitol-MacConkey agar (SMAC)

Key Facts:

 *E. coli* is one of the many bacterial species that is a part of your normal intestinal flora. There are hundreds of strains of the bacteria found around the world; most strains cause no problem when accidentally ingested, but there are several strains that are associated with traveler’s diarrhea and one strain, O157:H7, which is a major food borne pathogen that in some cases can lead to deaths. In recent years, strains of E. coli, such as O157:H7 have been found to produce a shiga-like toxin similar to that produced by the bacteria that cause bacillary dysentery. In *E. coli* caused disease, fecal material contaminating food or water is the common source of the disease. *E. coli* also is a common cause of urinary tract infections and when the bowel perforates, it can lead to peritonitis and become fatal.

 *E. coli* strain O157:H7 is far more serious than traveler’s diarrhea and results from *E. coli* strains that exist in the feces of healthy cows, and other ruminant animals contaminating food and water ingested by humans. Recent outbreaks of *E. coli* O157:H7 have occurred due to eating undercooked hamburgers, raw alfalfa sprouts, lettuce and spinach. Other sources have been due to drinking unpasteurized milk, water and juice, petting animals at petting zoos and swimming in contaminated water. Patients with the infection, particularly children, must wash their hands well after using the restroom to prevent spreading the disease to family members and friends; the bacteria can be shed in the feces of an infected person for up to two weeks after symptoms subside. Most people who get infected with *E. coli* O157:H7 show bloody diarrhea and have abdominal cramping from 2-8 days after becoming infected, although some people show few or no signs or symptoms. In a few cases, especially in young children and in the elderly, *E coli* O1157:H7 can lead to Hemolytic uremic syndrome which causes acute kidney failure and sometimes death. In most cases, patients recover with fluid therapy; antibiotics and anti-diarrheal medicines are not recommended. In persons who suffer from Hemolytic Uremic Syndrome, kidney dialysis and blood transfusions are necessary.

 To prevent contracting *E. coli* O157:H7, meats should be cooked to 160° F, wash fruits and vegetables and remove the outer leaves from green leafy vegetables, drink only pasteurized beverages or municipal water, use proper disinfecting techniques in the kitchen, make sure family members with diarrhea wash their hands with soap after defecating, wash hands thoroughly when going to petting zoos, and avoid drinking water while swimming.

Notes:

Fifth Disease

Parvovirus B19

Virus

Transmission: Respiratory

Vaccine: NO

Treatment: Rest, medication for joint pain and fever, Benadryl for itching.

Reportable: NO

Diagnostics: Blood tests are available to detect serum antibodies, but diagnosis is usually on exam.

Key Facts:

 Fifth disease, named by early doctors because it was the fifth of five childhood disease that caused rashes; the disease is also known as erythema infectosum. Fifth disease is a viral infection spread through respiratory droplets, more typically among children. It is caused by a parvovirus, but this is not the same parvovirus that causes diseases in other animals, like in dogs. Pregnant females who have been exposed to a person with fifth disease are advised to consult their doctor immediately, as the infection may cause problems such as severe anemia in the fetus; since most women have had fifth disease and carry antibodies against the virus, which can be detected by a blood test, exposure to the virus during pregnancy is only rarely a problem.

 In order to get the disease, a person must inhale respiratory droplets spread usually when another infected person coughs or sneezes or a person can get the disease by sharing utensils or drinking vessels. There is an incubation period of approximately a couple weeks. The infection usually appears first as a headache, mild fever and stuffy nose. After about 5 days, a red rash appears on both cheeks, looking like patient was slapped on both cheeks. The rash spreads as a blotchy red rash to the chest, abdomen and extremities but spares the palms and soles; the rash usually lasts a few weeks but in some individuals may last longer. By the time the rash appears on the face, children may go back to school, since this is an immune system response to the virus and the infection is no longer considered to be contagious. Some adults may get the infection and there appears to be a link to arthritis in these older individuals. There is no vaccine, prevention or treatment for fifth disease, and most patients are either asymptomatic or recover with complications.

Notes:

Filarial Worms (Elephantiasis and Others)

*Wuchereria bancrofti (elephantiasis); Loa loa (African eye worm); Onchocerca volvulus (river blindness); Dracunculus medinensis (guinea worm); and 5 others*

Nematodes (roundworms)

Transmission: Elephantiasis – mosquitoes; African eye worm – horsefly; River Blindness – black fly;

 Guinea worm – water fleas (copepods)

Vaccine: NO

Treatment: Elephantiasis – (depending on geographic region) diethylcarbamazine, albendazole, ivermectin

Reportable: NO

Diagnostics: Elephantiasis – microscopic examination of blood smears stained with Giemsa to observe microfilarial larvae (blood collection should occur at night); serologic

 tests

Key Facts:

 There are 9 types of filarial roundworms that infest humans. Some infest the lymphatic system; others infest subcutaneous tissues or serous cavities of the body. Filarial worms infest hundreds of millions of people around the world, primarily in tropical locations. In dogs, one type of filarial worm causes heartworms and is transmitted by mosquitoes. In humans, most people think of elephantiasis when filarial worms are discussed, but guinea worm, loa loa and river blindness are also caused by filarial worm infestations.

 Most cases of elephantiasis occur when the microscopic filarial worm *Wuchereria bancrofti* enters the human body with the bite of a mosquito. The roundworms invade the lymphatic vessels and lymph nodes and eventually result in obstruction of the lymphatic vessels. As a result of the disease, patients can suffer debilitating effects: most commonly they have swollen legs and when the disease occurs in men, a swollen scrotum. In order to diagnose the infestation, blood needs to be drawn at nighttime when the microfilaria larvae appear in the blood, in synchrony with the time that the mosquito vectors bite. Whether the lymphatic vessel obstruction is due to the worms or an inflammatory reaction is debated, but a worldwide effort to eradicate the disease hopes to meet the goal by 2020.

Notes:

Gas Gangrene

*Clostridium perfringens, Clostridium septicum* and other *Clostridium spp.*

Bacteria

Transmission: Contamination of wounds with soil or feces.

Vaccine: NO

Treatment: Debridement of wounds, IV antibiotics, analgesics, supportive for shock, hyperbaric O2 chamber.

Reportable: NO

Diagnostics: Gram stain wound fluid, culture, gas in tissues.

Key Facts:

 Gas gangrene is a medical emergency, causing death in some patients within 48 hours of infection when left untreated. The bacteria are present in soil and as a part of the normal human enteric flora. The disease is so rapidly fatal due to the production of several toxins. Wounds from trauma (car accidents, crushing injuries, open fractures, IV drug use), surgery (especially when involving the GI tract but also including “back room” abortions) and spontaneous causes (colon cancer, diabetic peripheral vascular disease) have all been documented but any deep wound that can provide an anaerobic environment for the spore forming Clostridium can support its growth.

 Typically the infection appears suddenly, with the area of the wound appearing pale and then brownish red and finally a blackish green color. The pain that occurs is extreme as gas bubbles appear in the wound fluid and can be felt in the surrounding tissue (crepitus). The fluid from the wound has what is described as a sweet odor. Rapid heart rate and breathing commonly occur as the patient becomes nervous and sweaty. Finally, shock occurs as the tissues surrounding the wound are destroyed and as the toxins spread through the body; death soon follows. Treatment of patients suspected of having gas gangrene must begin before cultures can be grown; the mortality rate is high even with treatment, especially with gas gangrene of the abdomen. Cleaning of the wound to remove dead tissue and foreign objects is important but intravenous antibiotics (even though these may not penetrate the wound in all cases), such as penicillin, analgesics and amputation is often required. Hyperbaric oxygen chambers have been suggested as well, when available, to kill the anaerobic Clostridium. Though rare in the United States, the disease if not caught immediately is often fatal.

 *Clostridium perfringens* can also be the source of food poisoning, especially in gravies, stews, and meat and poultry dishes that are heated and then let to sit. The severe cramping, diarrhea and nausea (typically without vomiting or fever) usually occur between 8-24 hours after ingesting the food and last typically around 24 hours in most people. The food poisoning is rarely fatal.

Notes:

Genital Warts

Human papilloma viruses

Virus

Transmission: Direct contact/ STD

Vaccine: YES (Gardasil protects against HPV Types 6, 11, 16 and 18)

Treatment: Topical prescription medications (podofilox, imiquimod cream), acid applications, laser therapy, cryotherapy, electro-cautery, surgical excision, interferon injections.

Reportable: NO

Diagnostics: DNA testing of Pap smear scrapings or biopsy.

Key Facts:

 Genital warts, like other warts in humans, are caused by human papilloma viruses (HPV) and cause benign grows of the epidermis. Also known as condylomata, condylomata acuminata or venereal warts, only some strains of human papilloma viruses result in genital warts; the others cause warts over other body surfaces. There are over 100 human papilloma types. Most genital warts are due to types 6 and 11, while types 16 and 18 are more commonly the cause of cervical cancer.

 Genital warts can appear as flesh colored raised areas on the mucus membranes of the genitals or the skin surrounding the genitals; they can grow to become cauliflower like growths. The incubation time for the disease is usually a few months but may be a year or more in some individuals. Many people are thought to be asymptomatic carriers of the viruses and they will never get genital warts, even though they can spread the viruses. In males, genital warts can occur anywhere on the penis, scrotum or anus and in females genital warts can occur inside or outside the vagina, in the cervix, on the labia and anus. Whether you are a carrier or have obvious genital warts, treatment is recommended. Topical prescription drugs for other types of warts are of no value, only drugs prescribed from your physician should be used to try to eliminate genital warts. Even when the lesions are gone, the viruses can remain latent in your system and you can still be contagious. The genital warts lesions can reoccur. Condoms, although decreasing the chance you will get an HPV infection, are not 100% effective in prevention but still should be used.

 A recent breakthrough vaccine, Gardasil, has been approved for both males and females between 9 and 26 years old; other vaccines are being tested and may soon appear. Gardasil guards against 4 HPV types: two (types 6 and 11) guard against the major causes of genital warts and two others (types 16 and 18) guard against the HPV types that cause almost three-quarters of cervical cancer cases. Because there are other types of HPV that can less frequently cause cervical cancer, it is recommended that cervical cancer screenings (pap smears) continue for women who have received Gardasil. HPV can also lead to anal cancer and one lesser known fact is that males can rarely get penile cancer from the HPV.

Notes:

Giardiasis

*Giardia lamblia*

Protozoan

Transmission: Fecal-oral ingestion of cysts

Vaccine: NO

Treatment:Furazolidone (Furoxone) (approved in US for giardiasis), metronidazole (Flagyl**),** quinacrine.

Reportable: YES

Diagnostics: Elisa test for stools; for microscopic examination, stool samples are usually required over a few days to look for parasite since the cysts are not always shed.

Key Facts:

 *Giardia lamblia* is common throughout the world and typically comes from water contaminated by the feces of both humans and many animals, including dogs and cats. Also known as “beaver fever,” when contracted by drinking contaminated wilderness water, the disease in many animals and humans appears to be asymptomatic. In others, the disease causes greasy diarrhea with fat droplets, horrible smelling flatulence, cramping and nausea. Sources of contamination include swallowing “recreational” water from lakes, rivers, shallow wells, swimming pools, hot tubs, and springs as well as ingesting cysts that can be found on fomites contaminated by people shedding the protozoan cysts in their feces. Giardia can also be found on uncooked foods when prepared by a person with the parasite or when the food is washed with water containing the parasite.

 Typically, people first show signs and symptoms from 1-2 weeks after ingesting the cysts and the diarrhea lasts from 2-6 weeks in healthy individuals. Children are often infected in day care centers and it is important to be sure children with the infection, people touching children and people touching diapers wash their hands with soap and water after the restroom is used. Infected people should not swim in recreational waters. If you must drink water of unknown quality, especially if you are hiking anywhere or visiting foreign countries in South America, Asia and Africa, it is always best to boil or filter the water (use filters rated for cyst removal); chlorine and iodine treatment of water may not be 100% effective. Remember to check bottled water to make sure the seal has not been broken to ensure safety.

Notes:

Gonorrhea

*Neisseria gonorrhoeae*

Bacteria

Transmission: Sexually transmitted disease

Vaccine: NONE

Treatment: Antibiotics

Reportable: YES

Diagnostics: Gram stain of urethral discharge; culture of discharge; Nucleic Acid Amplification tests

Key Facts:

 Gonorrhea is a very contagious sexually transmitted disease that has many nicknames, including “the clap” and “the drip.” The disease most commonly shows signs and symptoms in males, where they may have a burning sensation when urinating and have a thick purulent discharge from the penis; some are asymptomatic. Females are, more often than men, asymptomatic, but can also have frequent, painful urination and there may be a discharge; very commonly though the female learns of her infection from her sexual partner.

 The disease can be diagnosed by doing a Gram stain on the exudates from the penis or vagina, where the gonococci appear as diplococci within neutrophils. Culturing the pus from the urethra can also yield a positive diagnosis and the NAAT test is the standard test used in labs to diagnose *Neisseria gonorrhoeae*. Signs and symptoms can appear from 2- 30 days after infection, and in females it may take months. Antibiotics are prescribed for gonorrhea infections, but there are resistant strains, so, as with all antibiotics, the full course of treatment must be finished. Successful treatment does not produce immunity so reinfection can occur. Untreated, gonorrhea can result in several possible consequences including epididymitis and swollen testicles in males and pelvic inflammatory disease and ectopic pregnancies in females. In both males and females, infertility may result when scar tissue blocks the vas deferens in males and the fallopian tubes in females. Pregnant females can pass the infection to their newborn children, when delivering vaginally; this can result in blindness (gonococcal ophthalmia neonatorum) if the infection gets in the eyes, as well as joint and blood infections. It is routine to treat newborns with ophthalmic antibiotic drops to prevent blindness due to gonorrhea. Gonorrhea can infect the throat and cause a sore, red throat and tonsils with painful swallowing. The infection can occur in the rectum after anal intercourse, sometimes causing slight pain and a discharge. The bacterium can also become systemic, causing joint pain and swelling, skin sores and fever.

 Gonorrhea is most commonly found in people under 30 years old, due to their sexual activities and lack of protected sex. Safer sex includes having a monogamous partner, and properly using latex condoms (with water based lubricants if preferred). In children, gonorrhea should be looked at suspiciously as potential sexual abuse. Routinely, when testing for gonorrhea, chlamydia, syphilis and HIV are also often tested for; chlamydia infections mimic gonorrhea in many ways.

Notes:

*Haemophilus influenza* Type b

*Haemophilus influenza*

Bacteria

Transmission: Respiratory droplets, contact

Vaccine: YES (Hib vaccine)

Treatment: Antibiotics (third-generation cephalosporins, chloramphenicol, ampicillin)

Reportable: YES

Diagnostics: Bacterial culture of blood or CSF

Key Facts:

 *Haemophilus influenza* type b is a bacterial infection that is the most common etiology of meningitis in children less than 5 years of age. In the Unites States, the disease is now rare, due to the development of the Hib vaccine during the 1980’s, but in areas of the world where the vaccine is not commonly used, the disease is still too common. The scientific name of the bacterium is misleading since initially the bacterium was thought to cause influenza. Further study during the 1900’s proved that viruses case the flu; *Haemophilus influenza* type b can cause epiglottitis, osteomyelitis, joint infections and a bacteremia though. *Haemophilus influenza* type b is an encapsulated serotype of the bacteria, while unencapsulated serotypes of *Haemophilus influenza* can cause a highly contagious form of conjunctivitis (pinkeye), as well as otitis media, and pneumonia.

 The bacterium is a common part of your upper respiratory bacterial flora and is spread through respiratory droplets or by coming in contact with nasal or throat discharges. Within 10 days of exposure to the bacterium, symptoms usually appear. Meningitis is characterized by having a fever, a stiff neck, and flu like symptoms. Antibiotics are used to cure the infection. Untreated, the disease results in brain damage and can result in death.

Notes:

Hansen Disease

*Mycobacterium leprae*

Bacteria

Transmission: Respiratory droplets and contact with mucus membranes suspected.

Vaccine: NO

Treatment: Multidrug therapy consisting of Dapsone (diaphenylsulfone), rifampicin and Lamprene (clofazimine)

Reportable: YES

Diagnostics: Acid fast bacilli found in biopsy samples from skin nodules or from corneal, conjunctival, and subcutaneous skin scrapings; anterior chamber or vitreous taps.

Key Facts:

 Hansen disease (also referred to as Hansen’s disease) is an infection of the skin, mucous membranes and nerves which is caused by a very slow growing bacterium that, to date, is not able to be grown on any known bacteriologic medium. Historically, the disease used to be called leprosy and was so feared that people with the disease were often isolated in colonies far from the general population; the fear came from the disfiguring nodules and the loss of extremities, like fingers and toes, causing patients to become disabled. The disease is not highly contagious (most people seem to be immune) and can be successfully treated when diagnosed early, with no long term disability. Most cases of Hansen disease occur in and around India, but even in the United States there are several thousand people who have the disease. Interestingly, armadillos also can be infected with *Mycobacterium leprae*.

 Early on in the infection, which can have an incubation period of six months to several years, there can be a slight loss of sensation and a red rash in the area infected. Biopsy of the rash can reveal the acid fast staining bacilli. There are two types of leprosy. The more common type, the tuberculoid (paucobacillary) type is not highly contagious, has few bacteria, and typically results in numbness and ulceration of the extremities; untreated this type can result in self-mutilation with the loss of fingers and toes. The lepromatous (multibacillary) type has many bacteria associated with it, is more contagious and is the type we typically think about when envisioning a leperotic patient, with skin nodules of the eyes, nose and body with thickened skin on the face and ears. Nasal congestion may occur as can a thinning of the eyebrows and eyelashes. Untreated, this form of Hansen disease can result in blindness, mutilation of the nose and a change in vocal quality. Due to resistance bacterial resistance, the recommended treatment for Hansen disease is a multiple drug therapy, which after a few doses, makes the disease no longer communicable.

Notes:

Hantavirus

Bunyavirus

Virus

Transmission: Respiratory from rodent urine, saliva and droppings.

Vaccine: NO

Treatment: Symptomatic support for respiratory failure.

Reportable: YES

Diagnostics: Serologic ELISA testing for IgM

Key Facts:

 Hantaviruses exist worldwide, but were only discovered in the 1950’s in Korea as the etiologic agent causing Hantavirus Fever with Renal Syndrome, which occurs in Asia and western Europe. In the 1990’s a new disease was diagnosed in the “four corners” region of the southwestern United States as Hantavirus Cardiopulmonary Syndrome (or Hantavirus Pulmonary Syndrome = HPS). The source of the hantavirus infections was determined to be rodents; people inhaling dust from dried rodent urine or feces or coming in contact with rodent pellets are those at risk. Since then, it has been found that hantaviruses exist in many rodent populations throughout the United States and the disease has probably been present for a while, undetected until recently.

 The hantaviruses that cause HPS occur in North and South America. Taking between 1 to 6 weeks to incubate, the virus doesn’t affect the rodents and isn’t communicable between people. Initially, patients suffer from flu like symptoms for a few days and often appear to be recovering when the disease takes a turn for the worse and the patients have difficulty breathing due to fluid that fills the lungs. There is no known treatment for HPS; supportive systemic care must be attempted to combat the respiratory failure that kills perhaps half of all patients.

 To prevent exposure to this very rare disease, make sure rodents are not living in your home or in outdoor areas. If you go into an area where rodent droppings are found, let the building air out for an hour and do not sweep or vacuum the area; instead spray the rodent droppings, the floor and any dead rodents with a 10% bleach solution and let the disinfectant sit for 30 minutes. Wearing rubber gloves and a surgical mask clean up the decontaminated area and put all waste in the trash or incinerator. Always wash your hands with soap and water when you complete the cleanup of rodent droppings. When camping, sleep in a tent and stay away from rodent nesting areas. If flu like symptoms appear after exposure to rodents or their droppings, call your doctor immediately.

Notes:

Hepatitis A

Picornaviridae (RNA)

Virus

Transmission: Fecal-oral

Vaccine: YES (Havrix or VAQTA, inactivated whole virus vaccine)

Treatment: Rest, symptomatic support

Reportable: YES

Diagnostics: Hepatitis A antibody test

Key Facts:

 Hepatitis A causes an inflammation of the liver and was formerly known as infectious hepatitis. People acquire the virus from the fecal material of persons with hepatitis A infection, or by coming in contact with food, water or fomites contaminated with that fecal material; blood and other body fluids can also be source of the virus. People who are at highest risk include people in day care centers and nursing homes and people eating at restaurants where employees don’t wash their hands, as well as people who practice anal sex and who use intravenous drugs. Shellfish have been implicated in hepatitis A outbreaks, as well. There is an incubation period of 2 to 5 weeks. The virus causes jaundice, abdominal pain, fatigue, nausea, diarrhea and fever, but is rarely a cause of death and in many people causes mild flu-like symptoms or no signs and symptoms. Very rarely are there complications from hepatitis A infection. During acute hepatitis, alcohol, fatty foods and medications that can affect the liver need to be avoided.

 There is a vaccine for hepatitis A which takes approximately 2-3 weeks to begin providing immunity; a booster is necessary 6-12 months after the initial vaccine. For unvaccinated people who have possibly been exposed to the virus, there is an immune globulin shot which can provide more immediate protection. The disease does not cause a chronic infection and once you have had the disease, you are immune; people who have had hepatitis A will show positive test results.

Notes:

Hepatitis B

Hepadnaviridae (DNA)

Virus

Transmission: Contact with blood, saliva, semen, and other body fluids

Vaccine: YES (Energix-B and Recombivax-HB, recombinant DNA vaccines)

Treatment: None for acute infection; interferon, lamivudine ( for chronic hepatitis B).

Reportable: YES

Diagnostics: Hepatitis B antibody test

Key Facts:

 Hepatitis B, formerly known as serum or transfusion hepatitis, is a much more dangerous infection than hepatitis A and E, and is spread by contact with blood and body secretions, such as saliva, semen, vaginal fluids and breast milk and is transmitted commonly during sexual contact and when sharing needles when injecting illegal intravenous drugs. Health care workers who commonly come in contact with human body fluids must be vaccinated; blood banking procedures in the United States screen for the virus, so blood transfusions don’t transmit the virus. Infections have also been spread by sharing razors and toothbrushes, and through tattooing, acupuncture and body piercing with unsterilized equipment. Since the virus is not shed in the feces and is shed in such small amounts from urine, food and water transmission does not occur, but pregnant mothers can infect their babies during the vaginal delivery of their baby. In some tropical locations, mosquitoes and bed bugs have been shown to transmit the virus.

 As with other hepatitis inducing viruses, hepatitis can result in jaundice and dark colored urine, abdominal pain, nausea, low grade fever, fatigue and loss of appetite. Incubation periods vary from 1-6 months after exposure to the virus. If unprotected, most adults, when infected suffer from acute hepatitis, which can last up to six months; they will completely clear the virus from their system and will have lifelong immunity with no long term consequences. Young children and babies have a higher risk of developing chronic hepatitis that adults do, but any chronic carrier is able to spread the virus. Many chronic carriers have no apparent signs of disease but they run an increased chance of developing permanent scarring of the liver and liver cancer, which is due to the immune system’s response to the infection damaging the cells of the liver. Besides avoiding risky behaviors that are known to spread hepatitis B, there are 2 ways to prevent getting hepatitis B infections: you can get serum antibodies within ten days of exposure and you can get vaccinated with a three shot series of injections. Treating patients who have liver damage attempts to reduce the liver’s inflammation, but eventually some chronic hepatitis patients may require a liver transplant.

 Hepatitis D is an incomplete RNA virus, with only a partial set of genes, and is unable to cause disease unless it is accompanied by the virus that causes hepatitis B; it usually occurs with hepatitis B, it can make hepatitis B infections worse and it is treated in the same way hepatitis B is treated. There is a hepatitis D antibody test and immunization with the hepatitis B vaccine prevents hepatitis D from causing disease.

Notes:

Hepatitis C

Flaviviridae (RNA)

Virus

Transmission: Blood to blood contact

Vaccine: NO

Treatment: Pegylated interferon and Ribavirin

Reportable: YES

Diagnostics: Hepatitis C antibody test

Key Facts:

 Hepatitis C, also known as transfusion hepatitis, is another inflammatory disease of the liver caused by a virus. There are six different genotypes of virus that can cause hepatitis C, determining which type a patient has can affect the prognosis and success of treatment. The virus that causes hepatitis C is spread through contact with human blood. Blood banking procedures have tested for the presence of the virus since 1992, but people receiving blood or organs before that, people who received clotting factors before 1987 and hemodialysis patients are most at risk. Intravenous drug users seem to be the most common group of people who currently get infections; snorting cocaine also provides a risk of transmission. Health care workers must follow proper precautions when dealing with needles and sharps; there is no current vaccine for hepatitis C, the virus mutates rapidly and a vaccine may not be developed for a while. People should not share toothbrushes or razors and they need to be aware of the practices used to sterilize the equipment at tattoo and body piercing parlors. Hepatitis C is rarely spread by having sex, but condom use is always recommended to prevent the spread of many diseases when sexual relationships occur with multiple partners. Babies born to infected mothers can also rarely acquire the infection.

 During the first 6 months after infection, the acute phase, most people are unaware that they have the infection. Some patients suffer from the typical symptoms of hepatitis, jaundice, fatigue, abdominal pain in the upper right quadrant, nausea and vomiting, dark urine, low grade fever and some itching. Patients with hepatitis should avoid alcohol, fatty foods and any medications of supplements that may affect the liver. There is no cure for hepatitis C and most patients (80%) progress to the chronic phase of the infection. It is recommended that patients with acute hepatitis C receive treatment with pegylated interferon and ribavarin; some genotypes of the virus produce a high percent of patients showing a sustained response (no virus detected after 6 months of treatment). Most people with chronic hepatitis C also are unaware that they have an infection and typically the infection is discovered when blood work is ordered during a routine checkup or during some other medical procedure. About 20% of chronic hepatitis C patients progress and develop cirrhosis (scarring) of the liver and a small group of these patients develop liver cancer. Hepatitis C infections currently account for most liver transplant operations in the United States. As with hepatitis B, there are support groups that help patients deal with their infection.

Notes:

Hepatitis E

Hepeviridae (RNA)

Virus

Transmission: Fecal-Oral

Vaccine: NO

Treatment: Symptomatic support

Reportable: NO

Diagnostics: No currently approved FDA tests, hepatitis antibody E tests are available but should be read with caution.

Key Facts:

 Hepatitis E infection causes an inflammation of the liver and most closely resembles hepatitis A in the route of transmission and severity of disease. Hepatitis E is transmitted when people ingest water or food that has been contaminated with feces; shellfish from these areas are often suspected. The virus has been detected in several animals such as pigs, ruminants and rodents and can be zoonotic. It is more commonly a problem in third world countries, like India, Asia, Africa and Central and South America, than in the United States, especially after monsoons and flooding, and in areas where proper disposal of human waste is not practiced; direct person to person transmission is rare. Most people in the United States who get the infection are travelers and the disease appears to most often in people between 15 and 40 years of age.

 The disease generally has an incubation period from 2 weeks to 2 months and causes an acute infection with the common signs of liver inflammation: jaundice, flu like symptoms, abdominal pain and dark colored urine. There are no chronic cases of this form of hepatitis and people are considered to be noninfectious 2 weeks after symptoms appear. Most cases respond to rest and supportive therapy. In pregnant females, a fulminant form of the disease can occur which can result in the death of the mother and stillborn children; pregnant females exposed to the virus and showing signs and symptoms of hepatitis need to seek medical care.

 Prevention of the infection is through good personal hygiene and proper elimination of fecal wastes. Travelers need to follow the standard protocol for prevention of waterborne illnesses, avoiding water and ice from unknown sources, shellfish, and fruits and vegetables that have not been cooked or peeled. In 2007 a promising new vaccine was tested and is being researched.

Notes:

Herpes simplex 1 and 2

Herpesviridae

Viruses

Transmission: Herpes Simplex 1 (HSV-1) contact with saliva; Herpes Simplex 2 (HSV-2) STD

Vaccine: NO

Treatment: For severe cases, there are antiviral medications: Acyclovir (Zovirax), Famciclovir (Famvir) and Valacyclovir (Valtrex)

Reportable: NO

Diagnostics: Viral culture can be performed on viruses from fluid in sores; blood testing for antibodies can be done to determine if a patient has had previous exposure to herpes simplex

Key Facts:

 Herpes simplex viruses occur in many people and fall into two categories. Human herpes simplex 1 (HSV-1) typically results in cold sores and fever blisters of the mouth and face. Human herpes virus 2 (HSV-2) causes genital herpes sores. The sores from either virus can occur anywhere on the body though, entering through cuts or abrasions in the skin, and they can even cross contaminate; HSV-1 can occur genitally and HSV-2 can occur orally. HSV-1 is acquired by contact with saliva and HSV-2 is a sexually transmitted disease and most adults have antibodies to HSV-1(over 80%), while about one third of adults have antibodies to HSV-2. This means many people have been exposed to these viruses and most people appear to be asymptomatic.

 Typically, for people that get visible herpes sores, a primary infection with herpes simplex will cause signs and symptoms in a few days to two weeks. Initially the patient may have a fever, enlarged lymph nodes, or a feeling of burning or itching in the area infected; remember many people are totally asymptomatic. Eventually the skin becomes red and fluid filled vesicles appear; these may last for one to two weeks unless the patient has an immune system weakness. Herpes simplex skin infections occur in people who get the virus in cuts on their fingers; these infections are called “herpetic whitlows.” Herpes simplex infections can occur in athletes, like wrestlers, who come in close skin contact; this is termed “herpes gladiatorum” and can cause wrestlers to be banned from wrestling until the skin lesions resolve. Good personal hygiene and disinfection of mats and the environment are crucial steps in preventing these infections in athletes. Herpes simplex can cause a rare but fatal meningoencephalitis, and in the eyes, herpes simplex can cause an infection of the cornea, that can lead to blindness. In pregnant mothers with visible herpes lesions, C section deliveries are recommended; herpes infections of the newborn, especially if the mother becomes infected in the last trimester, can be a fatal disease. Pregnant mothers with herpes but without active lesions may have vaginal deliveries, but should be closely monitored; various anti-herpes medications are approved in pregnant women.

 Remember there is no treatment for herpes simplex, one of those “gifts that keep on giving.” The medications used to treat herpes simplex patients are meant to reduce the recurrence and severity of outbreaks, not to cure the virus. The virus remains latent in nerve cells; the virus causes a lifelong infection and the sores can recur. It is possible to spread the virus even when not showing herpes sores. When sores appear it is critical to abstain from sexual relations, condoms do not offer total protection, even though they may help prevent the spread of the viruses. People with active lesions should not come in contact with newborns or patients with immune compromising diseases. Often in large communities there are support groups for patients with genital herpes.

Notes:

Histoplasmosis

*Histoplasma capsulatum*

Fungus

Transmission: Respiratory inhalation of spores

Vaccine: NO

Treatment: Itraconazole, Amphotericin B

Reportable: NO

Diagnostics: Fungal stain (best if a suitable sample can be obtained), fungal culture (2-4 weeks incubation), serology and skin tests (may indicate previous and not active infections).

Key Facts:

 Histoplasmosis, also known as Darling’s disease, is a fungal infection that can occur worldwide, but in the United States it occurs most commonly in the Ohio, Missouri and Mississippi River Valleys; some cases have been seen in Central Florida. The fungus produces spores which commonly are found in places with damp soil and where bird and bat droppings occur. The disease does not affect birds, isn’t zoonotic from pet birds, and isn’t contagious from other people, the fungal spores in the soil are the source of infection. Most people, in regions where the fungus is endemic, have serum antibodies, indicating they have been exposed to the fungus and their immune system has eliminated the infection. In the elderly, the very young and in patients with immune compromising health problems, the fungus can cause more severe respiratory problems, pericarditis and arthritis. In some cases, if the disease spreads throughout the body, a condition known as disseminated histoplasmosis can cause death.

 For patients that inhale many spores, such as people that enter chicken coops, caves and old barns, there is an incubation period of a few days to about two weeks. In patients that develop signs and symptoms, fever, headache, night sweats, a dry cough and chest pains can occur. In people with chronic lung conditions, infection with the fungus can mimic tuberculosis, where the patients cough up blood, have fever, night sweats and fatigue. In people with the disseminated form of the disease, which usually occurs only in infants and people with immune compromising health conditions, the infection spreads to other organs in the body. Even when treated this condition can sometimes be fatal, untreated cases inevitably lead to death.

 People who get histoplasmosis develop a reduced ability to become reinfected but are not totally immune. People, who come in contact with soil or dusty environments, especially when birds and bats inhabit the area, should wear masks that protect from spores and may want to dampen the area they are working in to minimize the movement of the spores in dust.

Notes:

Hookworms

*Necator americanus* and *Ancylostoma duodenale*

Nematodes (roundworms)

Transmission: Penetration of skin, oral

Vaccine: NO

Treatment: Albendazole, Mebendazole and Pyrantel pamoate

Reportable: NO

Diagnostics: Microscopic examination of feces to look for hookworm eggs

Key Facts:

Human hookworm infestation from *Necator americanus* (aka: new world hookworm) was once common in the southeast United States, up until the 20th century. The parasitic worms are shed in the feces of infected people. When human sewage is used as fertilizer or is not disposed of properly, hookworm infestation is common. The larvae of *Necator americanus* penetrates the skin of a person; the larvae of *Ancylostoma duodenale* (aka: old world hookworm) can enter the body orally as well as enter through the skin, People walking barefoot on warm, moist soils, where human feces is present, are at high risk. Hundreds of millions of people, primarily in tropical countries, are infested with human hookworms.

 The worms cause “ground itch” an allergic response at the site where the larvae penetrate the skin. After traveling through the blood, the larvae wind up in the lungs where they penetrate the alveoli and migrate up the trachea. From the trachea, the larvae are coughed up, swallowed and end up in the intestine of the victim. The adult worms attach to the lining of the small intestine where they suck blood and damage the intestinal lining. Hookworm infestation can be debilitating and can lead to anemia, protein loss, diarrhea, gastrointestinal pain as well as impaired growth and reduced mental development in children.

One commonly made mistake is that the hookworms of dogs and cats are the same hookworms that infest people. In humans, the dog and cat hookworm can enter through the skin of a person and wander through the skin, causing “cutaneous larva migrans.” The dog and cat hookworm does not typically progress past this stage in the skin, but the condition is very pruritic and leaves red tunneling tracks as the larva migrate aimlessly through the skin. When children play outdoors in areas where dogs and cats defecate, this malady can occur.

Notes

Human Immunodeficiency Virus (HIV/AIDS)

Retroviridae

Virus

Transmission: STD, blood, blood products, mother to child

Vaccine: NO

Treatment: HAART (Highly Active Antiretroviral Therapy)

Reportable: YES

Diagnostics: ELISA and Western Blot tests

Key Facts:

 Human immunodeficiency virus (HIV) causes a chronic infection that, over time, destroys a person’s immune system and leads to a condition known as acquired immune deficiency syndrome (AIDS). HIV has reached pandemic proportions, especially in Africa and Southeast Asia, but the disease occurs worldwide. The method of transmission is usually through unsafe sexual practices and the use of intravenous drugs, but blood transfusions, blood products, organ transplants and artificial insemination have all been known to be sources of HIV infection as well. Babies can be infected in the womb through the placenta and by drinking breast milk. HIV infection is one of several concerns for health care workers who come in contact with blood and body fluids through accidental needle sticks and from performing invasive procedures. You cannot get HIV from mosquitoes, swimming pools, household utensils, toilet seats, hugging or simply kissing someone. Donating blood in the United States is completely safe as well. To prevent acquiring the disease, avoid risky behaviors; use a latex condom (water based lubricants only) when having sex with anyone other than a monogamous partner and don not use drugs or alcohol as they can impair your judgment. Remember condoms provide safer sex; the only safe sex is abstinence, unless you have a monogamous partner.

 From the moment a person is infected, that person becomes infectious to other people. Many people will have no signs or symptoms while others have mild flu like symptoms approximately 2-4 weeks after infection. In some untreated patients they may have no idea that they are infected for more than 10 years and positive ELISA and Western Blot antibody tests won’t appear until 2-3 months into the infection. As the virus starts to attack a person’s helper T cells (CD4 white blood cells), the disease progresses from asymptomatic to the early symptom stage, when immune system failure begins. In the early symptom stage, patients begin to have sore throats and mouth sores due to *Candida* infections, headaches, diarrhea, weight loss, swollen lymph nodes, persistent fevers, night sweats and fatigue. If untreated, most patients eventually progress to develop AIDS. People don’t actually die from HIV, they die from opportunistic infections which overwhelm their immune system; tuberculosis, *Pneumocystis* pneumonia, toxoplasmosis, cytomegalovirus, various epithelial cancers (Kaposi’s sarcoma- human herpes virus 8) and other infections are the most common causes of death.

 Diagnosis of HIV is initially through an ELISA test, but since there are false positives with the test, the Western Blot test is done to confirm positive results. Treatment involves “drug cocktails”; a protocol known as HAART employs the use of several different medications which interfere with the virus’ reproduction cycle at multiple stages of viral development and attachment, all at the same time, to minimize drug resistance. The drugs must be taken religiously to prevent drug resistant strains from developing; support groups for HIV patients are available in most urban areas.

Notes:

Influenza

Orthomyxoviridae

Virus

Transmission: Respiratory

Vaccine: YES (Trivalent flu vaccine; Flu mist- nasal vaccine)

Treatment: Symptomatic treatment, zanamivir (Relenza) and oseltamivir (Tamiflu)

Reportable: NO (except influenza-associated pediatric mortality)

Diagnostics: Various rapid diagnostic influenza tests are available

Key Facts:

 Influenza, also called the flu or the grippe, is a contagious respiratory viral disease that originally was named influenza in Italy, during the middle ages, because it was thought that the sun, moon and stars had an influence in causing the disease. People with the flu initially may feel like they have a cold, but the flu lasts longer, is more serious and makes people feel much worse than the cold. Malaise, weakness, muscle and headaches, fever with chills and sweating, dry cough, nasal congestion and decreased appetite are common symptoms of flu sufferers. In children, vomiting and diarrhea may also occur, but the term stomach flu, which describes a gastrointestinal infection, has nothing to do with the influenza virus. There are three main flu types (strains), A, B and C. Influenza types A and B are included in human vaccines, since they are the most common and serious cause of flu outbreaks. Influenza viruses can also infect other animals, especially birds and pigs, and influenza viruses mutate rapidly, causing the formation of numerous influenza serotypes (mutated strains).

 When a patient gets the flu virus, they are usually sick for one to two weeks. In some very young or old patients or those with respiratory and immune system problems, the flu can become a deadly disease, especially when infected by secondary bacterial pneumonias; it is a good idea for elderly people to get the pneumococcal pneumonia vaccine to reduce the risks of getting this type of bacterial pneumonia. Because the influenza viruses mutate so rapidly, vaccination for influenza is recommended yearly, especially in certain high risk populations: people 65 and older, children between 6 and 23 months, people with any chronic medical condition, women planning on becoming pregnant during the flu season, health care workers, nursing home workers and those in nursing homes, children on chronic aspirin therapy, and those people in contact with children under 6 months should all be vaccinated yearly for influenza. It is not a bad idea for emergency service workers, teachers and children in schools and anyone around a susceptible person to get a vaccine, also. The flu vaccine is approved for people older than 6 months of age (who do not have egg allergies) and it is safe. The vaccine doesn’t guarantee you won’t get the flu, since the trivalent injectable vaccine only contains the three most recent and serious flu strains, but it will greatly reduce the chances of you getting the flu and the severity of the symptoms if you are infected.

 To treat most influenza infections, bed rest and drinking plenty of fluids is sufficient; pain relievers like acetaminophen are often helpful (do not use aspiring in children with the flu). For those people in high risk groups, the doctor may want to prescribe an antiviral medication, such as oseltamivir (Tamiflu-oral) or zanamivir (Relenza-nasal spray); these medicines must be given during the first 48 hours of fly symptoms to be effective and they can have side effects in some patients. To prevent getting influenza some helpful advice would be to wash your hands regularly, avoid crowds, eat and sleep right, exercise and get vaccinated.

Notes:

Klebsiella Infections

*Klebsiella pneumoniae*

Bacteria

Transmission: Contact with contaminated instruments or feces

Vaccine: NO

Treatment: Antibiotics

Reportable: NO

Diagnostics: Bacterial lab culture from infected site

Key Facts:

 *Klebsiella pneumonia* bacteria are common inhabitants in the normal gastrointestinal flora. It is when the bacteria escape and contaminate other sites in the body that *Klebsiella* can cause serious infections. It was to differentiate *Klebsiella pneumoniae* from *Streptococcus pneumoniae* that Christian Gram developed the gram stain in the late 1800’s. Klebsiella can infect people, most commonly alcoholics, diabetics and people with chronic lung disease, causing pneumonia. In the hospital, *Klebsiella* is often nosocomial and results in pneumonia as well as urinary tract infections, septicemia, and surgical wound infections.

 As pneumonia, *Klebsiella* causes patients to rapidly suffer from fever and chills and they commonly cough up sputum that is referred to as a cherry red or “currant jelly” sputum. *Klebsiella pneumoniae* pneumonia, septicemia and surgical wound infections can be fatal if left untreated; the infection can be difficult to treat due to the thick capsule surrounding the bacterial cells. Antibiotics are available to treat these bacteria, but increasingly antibiotic resistant strains are appearing, so a culture and sensitivity is advisable when treating these infections. The rate of mortality from *Klebsiella* related illness, like pneumonia is fairly high, usually around 50%.

Notes:

Legionnaire’s Disease

*Legionella pneumophila*

Bacteria

Transmission: Respiratory droplets from water sources contaminated with the bacterium.

Vaccine: NO

Treatment: Antibiotics

Reportable: YES

Diagnostics: Bacterial culture of sputum, Urine Antigen test, Antibody tests from blood samples.

Key Facts:

 Legionnaire’s disease, or legionellosis, was first recognized during an outbreak of pneumonia in people attending the 1976 American Legion convention, held in Philadelphia; the bacterium is suspected to be the cause of pneumonia before the convention, but it was not recognized until the outbreak in Philadelphia. Typically people with underlying respiratory problems, heavy smokers, chronic alcoholics, the elderly and anyone with immune compromising conditions are at risk of contracting the bacterium. People with legionellosis typically demonstrate flu like symptoms accompanied by pneumonia which lasts for 1 to 2 weeks when treated with the appropriate antibiotics. The incubation time is from 2 days to 2 weeks although most people when exposed to the bacterium do not suffer any ill effects. In some people, the bacterium may cause a milder disease called Pontiac Fever. Patients with Pontiac fever have similar signs and symptoms, but without the pneumonia; Pontiac fever can occur within hours of exposure to the bacterium, lasts only a few days and typically goes away without any treatment.

 The bacterium appears to come from large water reservoir sources that produce aerosol droplets. Usually the source is large building water cooling tower and air conditioning system, but hot tubs, whirlpool spas, showers, air humidifiers and fountains have all been implicated. The bacterium can be found in freshwater streams and any warm source of water that produces a mist can be implicated as the source of infection; the disease is not communicable between people. These water sources need to be disinfected properly and regular maintenance schedules must be adhered to prevent this increasing source of pneumonia. Since legionnaire’s disease can be fatal, it is important to get patients suspected of having the disease on the appropriate antibiotics as soon as possible; most deaths occur when antibiotic treatment begins too late. Quinolone and macrolide antibiotics appear to be most useful in treating legionnaire’s disease and symptomatic care for pneumonia is often needed when patients are hospitalized.

Notes:

Leptospirosis

*Leptospira interrogans*

Bacteria

Transmission: Urine or fluids from the birth canal from animals: ingested or through mucous membranes and breaks in the skin.

Vaccine: NO (There is a vaccine for dogs which protects from only certain strains)

Treatment: Antibiotics

Reportable: NO

Diagnostics: Rapid serologic tests; bacterial culture on selective media; micro agglutination test

Key Facts:

 Leptospirosis is a zoonotic infection, also known as Weil’s disease, which is more common in tropical and subtropical countries, but can occur worldwide. There are at least 5 strains, or serovars, of the bacterium which is not spread between humans, but which is commonly acquired from contact with the urine of rats, dogs and cows, as well as other wild and domesticated animals. People who come in contact with animals, such as veterinarians, farmers, sewer workers and slaughterhouse workers as well as sports enthusiasts who come in contact with freshwater sources, such as swimmers, kayakers, etc. are most at risk. Leptospirosis outbreaks are common after flooding and travelers to endemic regions should be alerted as to the possibilities of infection when participating in recreational sports. The bacterium lives in warm moist areas such as mud, wet soil and fresh water. The bacteria are able to survive outside the body of an animal in soil for approximately three weeks and in fresh water for over 2 weeks. People get infections when the bacteria enter abrasions or mucous membranes and they can also acquire the infection when they ingest the bacteria, through food or water contaminated by animal urine.

 Infection with the leptospirosis spirochete usually takes from a couple of days to a month to begin causing fever, nausea, vomiting, diarrhea, muscle and headaches; this first phase of the disease in people resembles many other tropical diseases. The infection, in animals, can be asymptomatic or cause mild symptoms. After some improvement in the patient’s condition, without treatment, a second phase of the disease can occur where kidney and liver failure, meningitis and respiratory complications can rarely lead to death. This second phase of the infection can last from weeks to months, if untreated; in rare cases the infection can cause the death of the human fetus or congenital leptospirosis in pregnant women. Treatment for the disease includes antibiotics as well as supportive systemic care when needed. When exposed to animal urine, freshwater, damp soils and mud always wear protective clothes, such as gloves and boots. For those with occupational and recreational hazards, cuts and sores should have a waterproof bandage; for people travelling to endemic areas who anticipate probable exposure, prophylactic antibiotics should be taken as prescribed by your physician. Since vaccines for dogs usually only protect from two strains of the bacterium, people can get infected from vaccinated dogs who have other leptospirosis strains.

Notes:

Lice

*Pediculus humanus capitis* (head louse), *Pediculus humanus corporis* (body louse)

 and *Phthiris pubis* (pubic louse or “crabs”)

Arthropod (Insect)

Transmission: Person to person

Vaccine: NO

Treatment: Insecticidal shampoos (OTC and prescription)

Reportable: NO

Diagnostics: Visual observation of eggs (nits) on hair shafts, adult lice can be seen also

Key Facts:

 If you have ever used the terms lousy, nitwit, nitty gritty or nit picking, you have used terms which actually refer to lice. Lice are small blood feeding insects that live on the skin and hair and usually cause itching and leave a pink solid raised bump on the skin. When a person has lice, they are said to have pediculosis. There are three types of lice that are found exclusively in humans: head lice, body lice and pubic lice; you do not get lice from your pets or toilet seats and lice cannot jump or fly. Typically, head lice are shared when people wear each other’s hats or pillows, body lice and pubic lice are shared by direct contact with an infected person. The louse (singular for lice) has a life expectancy of about 30 days but cannot live off the human host for more than 2 days; lice bite to ingest blood to stay alive. Female lice lay eggs called nits which they attach to hair shafts close to the body; the nits hatch in 6-10 days and then become adults 10 days later.

 Head lice occur most commonly in children and can affect all socioeconomic groups of people. Body lice are found most commonly in underdeveloped parts of the world and in the homeless and usually are seen where poor hygiene and overcrowding occur; body lice typically live in clothing, where they lay their eggs, but they must feed from a person. Body lice are capable of transmitting diseases like typhus and trench fever. Pubic lice, also known as “crabs,” are transmitted during sex and although usually found on the genital region, they can occur anywhere on the body; they are not transmitted from toilet seats and condoms give no protection from pubic lice.

 People with lice usually itch and find nits attached at the bottom of hair shafts. Sometimes red bite marks can be found on the patient. There are several useful over-the- counter insecticidal shampoos that work to treat pediculosis patients at home. The medications can be used on children 2 years and older and on adults. For children less than 2 years of age seek help from your family doctor. After checking all members to see who is affected, the shampoos should be applied as directed on dry skin and hair, usually for ten minutes; reapplication must occur 7 to 10 days later to kill any nits that have hatched. Do not use hair conditioners before applying pediculocide shampoos and wait to wash your hair for 1-2 days after applying the anti-lice shampoo. It takes time to kill all of the lice with the anti-lice shampoo, so if you see movement of some of the lice still on the body, you do not need to retreat until 7 to 10 days later. Use nit combs to remove nits from the hair shafts. Bed linens and clothing worn during the 2 days before treatment should be washed in hot water (140° F); items which cannot be washed or dry cleaned such as stuffed animals can be put in plastic bags for 2 weeks to kill lice. You can also vacuum the floor and furniture and throw away the vacuum bag, and wash combs and brushes in hot water or alcohol; it is not necessary to fumigate your home. If non- prescription shampoos don’t work, your doctor can prescribe anti-lice medicated shampoos to help treat pediculosis.

Notes:

Listeriosis

*Listeria monocytogenes*

Bacteria

Transmission: Food poisoning

Vaccine: NO

Treatment: Antibiotics

Reportable: YES

Diagnostics: Bacterial culture of blood or spinal fluid

Key Facts:

 Listeria monocytogenes bacteria are ubiquitous, living in soil, water, on vegetation and in animals with asymptomatic infections. The bacteria can be found on produce and they are commonly found on raw meat and vegetables. People often get food poisoned when they consume unpasteurized dairy products or undercooked or poorly processed meat products. The incubation period can be from a week to a couple of months. The primary concern with listeriosis is the affect the infection has on unborn children and on people with compromised immune systems. In the fetus, an infection can lead to miscarriage when the infection occurs during the first and second trimesters, premature delivery or infection of the child at birth when the infection occurs later in the pregnancy; breast milk is not a proven source of infection. An infection with listeriosis can cause fever and muscle aches, nausea and diarrhea and eventually lead to infection of the nervous system, and other parts of the body as the bacteria spread through the circulatory system; about 20% of listeriosis patients die from the infection. Most healthy people when exposed to the bacterium suffer no ill effects.

 Although most people are not at high risk of getting listeriosis, there is a greatly increased risk of getting infected during pregnancy. There is no screening test for Listeria, so pregnant women and others at higher risk, with weakened immune systems, should avoid certain types of foods to minimize their risks. Women can transmit the infection to their unborn children even when they have no signs or symptoms. Foods to avoid include unpasteurized milk or foods with raw milk, any hot dogs or deli meats that aren’t heated until steaming hot, any soft cheeses unless they are labeled as being made from pasteurized milk, raw seafood, and refrigerated smoked seafood, pate or meat spreads; canned fish are safe to eat. One problem with this bacterium is that it is thermoduric, resists acid and osmotic pressure changes and can grow in foods while refrigerated. Wash your hands and all fruits and vegetables before eating and cook all food thoroughly. The treatment for listeriosis is antibiotic therapy and there is no lasting immunity once the patient recovers.

Notes:

Lyme Disease

Borrelia burgdorferi

Bacteria

Transmission: Tick-borne

Vaccine: NO

Treatment: Antibiotics

Reportable: YES

Diagnostics: ELISA, Western Blot in acute cases;

 Polymerase Chain Reaction (PCR) from joint or CSF fluid in chronic cases

Key Facts:

 Lyme disease is a tick-borne infection caused by a spirochete bacterium that when treated early has an excellent chance of being cured, but when allowed to become a chronic infection, problems affecting the nervous system can last for a lifetime. The disease has actually been recognized for many years in Europe, but was first named Lyme disease in 1975, when a group of children in Old Lyme and Lyme, Connecticut developed arthritic symptoms that were eventually traced to deer tick bites. The syndrome recognized from the outbreak is most prevalent in the northeastern and upper midwestern United States and is transmitted by deer ticks most often during the summer months when the nymph stage of the tick feeds on warm blooded animals; the disease is not contagious from person to person, but is transmittable through the placenta and can lead to stillborn deliveries.

 In many cases of the disease it takes from a few days to a month after a tick bites to see a “bull’s eye” red rash on the skin where the tick bite occurred. Not all infected ticks transmit the bacteria, since it takes 1-2 days before a tick starts to draw blood and transmit the bacteria, and not all people show a rash when bitten by infected ticks. In some patients, flu like symptoms can occur with the rash. Antibiotic therapy during this acute phase of the infection is usually very successful. If the person bitten by the tick doesn’t develop the typical signs and symptoms of Lyme disease or when the rash resolves within a month’s time and the patient doesn’t seek treatment, chronic borreliosis can occur. Chronic borreliosis can lead to arthritis, irregular heart rhythms, and chronic nervous system maladies, including facial paralysis, tingling and numbness in the extremities, as well as memory loss and difficulty concentrating. There is still controversy as to whether antibiotic therapy in chronic cases cures the infection; perhaps patients treated suffer from a cell mediated immune response that lingers long after the infection is cleared. Diagnosing the disease is often done by recognizing the rash while tests detecting antibodies require at least a few weeks before the antibodies can be produced by the body; a specialist in borreliosis should be consulted when Lyme disease is suspected.

 To avoid ticks when walking in grassy and woodland areas, wear long pants and long sleeve shirts, use insect repellents containing DEET or oil of lemon eucalyptus, and check yourself, your children and your pets for ticks. To remove a tick, use tweezers to gently grab the head of the tick and pull straight up slowly, no other method of tick removal is recommended; swab the bitten area with alcohol when the tick is removed. Remember, when bitten by a tick and you develop a rash, see a doctor.

Notes:

Malaria

*P. falciparum, P. vivax, P. ovale, P. malariae*

Protozoan (apicomplexa)

Transmission: Anopheles mosquito

Vaccine: NO

Treatment: Chloroquine, sulfadoxine-pyrimethamine (Fansidar®), mefloquine (Lariam®), atovaquone- proguanil (Malarone®), quinine, doxycycline, artemisin derivatives among others

Reportable: YES

Diagnostics: Blood smears, Antigen detection tests

Key Facts:

 Malaria is a parasitic infection caused by several species of protozoa in the genus *Plasmodium* and spread by the female *Anopheles* mosquito. Tropical and subtropical areas of the world have the most severe problems with the disease, which in earlier times was called ague. Malaria was once a problem even in the United States, especially in the southeast; malaria is a preventable and treatable disease that kills millions of people annually, primarily children, in many poor countries of the world.

 To get malaria, a person must be bitten by a female *Anopheles* mosquito that carries the protozoan in its salivary glands. Once the parasite enters the person bitten, the parasite travels to the liver where it matures and then escapes to invade red blood cells. Often in waves, the parasites burst out of the red blood cells to cause fever, shaking and chills, nausea and vomiting, muscle and headaches, anemia and jaundice. The start of symptoms can begin one week to one year after infection depending on several factors and the type of malaria parasite; infection with *P. falciparum* is the most deadly type and needs immediate hospital treatment when suspected and diagnosed, other types of malaria can be treated on an outpatient basis. Malaria can be a problem in pregnant woman, causing premature and stillborn deliveries, when they transfer the disease transplacentally or during delivery; it is not recommended that pregnant women travel to countries with malaria. Although not communicable from one person to another, the disease can be transmitted through organ transplants, blood transfusions and when needles are shared. Malaria patients and people who visit countries with malaria cannot donate blood for a period of from between 1 year to at least 3 years, depending on their situation.

 Although no vaccine currently is approved for use to prevent malaria, there are many medications that can be used to prevent the disease, and when traveling to a country known to have malaria, your doctor can prescribe the appropriate medications; see your doctor about one month before your trip and don’t not buy the prophylactic drugs overseas due to the potential for counterfeit or poor quality drugs. People who have had malaria and who revisit countries known to have malaria should also be on prophylactic medications. If infected by the malaria parasite, there are several medications that can provide a complete cure; treatments differ according to your geographic location due to the resistance developed by the parasites in many parts of the world. Unfortunately, in many poor areas of the world these medications are unaffordable.

 To prevent being bitten by mosquitoes when visiting countries known to have malaria, wear insect repellant containing DEET, wear long pants and long sleeve shirts at night, spray insecticides inside the dwelling, eliminate standing water around the home so mosquitoes can’t breed and use insecticide impregnated bed nets when sleeping, unless the accommodations are screened or air conditioned.

Notes:

Measles (Red)

Paramyxoviridae

Virus

Transmission: respiratory, aerosol droplets

Vaccine: YES (MMR)

Treatment: Supportive symptomatic treatment- fluids, rest

Reportable: YES

Diagnostics: Koplik’s spots; immunofluorescent virus tests of throat and urine specimens; serum antibody tests

Key Facts:

 Measles, also known as rubeola, ten day measles or red measles is a highly contagious disease spread by respiratory droplets; the disease is not related to German measles (rubella). Since the development of a vaccine for rubeola, the number of cases in the United States has become very low, but in underdeveloped countries of the world, the disease is still a problem and kills many children.

 The disease typically starts about 1 to 2 weeks after being exposed to the virus, which is spread when a person comes in contact with respiratory droplets from an infected person usually when they cough or sneeze; spread can occur by just breathing the same air as the infected person and can be fomite transmitted. At the beginning of the disease, the patient suffers from a cough, runny nose and watery eyes and fever. Koplik’s spots (tiny white spots on a red bump) typically appear inside the mouth and the patient often develops a sore throat a few days after the first signs appear. A couple of days after the Koplik’s spots appear, the patient will begin to see a red flat patchy rash that begins appearing on the head and face; the rash spreads to the torso and then the extremities and becomes bumpy as it progresses. As the rash spreads, the infected person will become more feverish (103°-105° F)and may be nauseous, have vomiting and diarrhea; the degree of itchiness can be variable depending on the patient. In most patients the rash disappears in 4-7 days. Some patients do suffer complications from measles, such as pneumonia and encephalitis. People with measles are considered contagious from 3 to 5 days before symptoms appear up until the rash fades. Due to the MMR vaccine, red measles is not a common disease any more in the United States. As a viral infection, there is no treatment other symptomatic treatment to allow the patient to rest, rehydrate and prevent the spread to others; antibiotics do not treat viral infections and aspirin is not appropriate for children with viral infections (Reye’s syndrome).

 Infants, malnourished children, those with underlying immune system weakness, adults and pregnant women are most at risk for serious complications from red measles; pregnant women who get the infection can suffer from miscarriages and premature deliveries. Most healthy children in the United States recover with no side effects. Lifelong immunity is typical after getting infected or vaccinated.

Notes:

Meningococcal meningitis

*Neisseria meningitidis*

Bacteria

Transmission: Exchange of respiratory droplets and throat secretions.

Vaccine: YES (MCV4 -MenactraT was licensed for use among persons aged 11-55 years; MPSV4- Menomune® is the recommended vaccine among persons aged 2-10 years and aged >55 years; MPSV4 is also an acceptable alternative for persons aged 11-55 years)

Treatment: Antibiotics

Reportable: YES

Diagnostics: Culture of bacteria from cerebrospinal fluid (CSF tap) or blood; latex agglutination test of CSF

Key Facts:

 Meningococcal meningitis is a rapidly fatal bacterial infection that causes inflammation of the meninges, the covering of the brain and spinal cord. *Neisseria meningitidis*, or meningococcus, is one of the three major bacterial causes of meningitis, which are usually more serious than viral causes of meningitis. The disease is most common in dry months and some strains can cause epidemics in parts of the world such as in sub-Saharan Africa; although not at as great a risk, high school students, college students, military personnel stationed in dormitory style housing also should be vaccinated. Sometimes 25% of people in a population are asymptomatic carriers of the bacterium; the disease is not zoonotic.

 Initial symptoms of the disease can begin from a few hours to 10 days after the bacteria enter the bloodstream and cross the blood brain barrier. Often the patient first has an upper respiratory infection; the classic signs and symptoms include fever, headache and a stiff neck which can be followed by nausea and vomiting, pain when in brightly lit areas, disorientation, sleepiness and seizures. The infection is communicable from throat and nasal secretions and anyone in the same household or classroom, anyone in close long-term contact or who has contact with an infected person’s oral-nasal secretions should be put on prophylactic antibiotic therapy to prevent getting the disease. Infected patients do not need to be isolated.

 Antibiotics are available to treat and prevent meningococcal meningitis and two vaccines are available in the United States which protect people from 4 serogroups: A, C, Y and W-135. Serious consequences, including brain damage, learning disabilities and hearing loss can result from the disease if not treated in a timely manner; the disease can be fatal. When traveling to areas where the disease is endemic, vaccination should occur more than 2 weeks in advance of your trip.

 When flu like symptoms are accompanied with a stiff neck, you should seek medical attention immediately, the disease is a medical emergency.

Notes:

Mononucleosis

Herpesviridae

Epstein - Barr virus (Human herpes virus 4- HHV4)

Transmission: Saliva

Vaccine: NO

Treatment: Supportive symptomatic therapy- rest and fluids

Reportable: NO

Diagnostics: Monospot test and other antibody detection tests

Key Facts:

 Infectious mononucleosis, also known as “mono,” the kissing disease and glandular fever, is a communicable disease most commonly seen in adolescents and young adults infected with the human herpes virus known as Epstein-Barr virus. Kissing, sharing drinking vessels, toothbrushes, eating utensils and very rarely coughing and sneezing are all methods of spreading the disease.

 Most people are exposed to the virus as children, when it may cause very mild respiratory symptoms; it is believed that many people are asymptomatic carriers and many people when exposed suffer no problems. If exposed as an older teenager or an adult the disease is usually more severe and lasts longer. People with the disease feel chronically tired and weak, they have swollen lymph nodes, fever, sore throat, headaches, rashes and night sweats may occur. The disease has an incubation period of from 4 to 6 weeks and usually lasts about a month. During the disease, it is recommended that the patient rest and drink plenty of fluids; pain relievers, other than aspirin, can be given to make the patient feel better as well. Most cases of infectious mononucleosis get better over time without medical treatment and antibiotics are not useful since they do not work against viral infections. Due to the infection, complications of an enlarged spleen and hepatitis may occur; sports and other rough physical activity should be curtailed during the course of the disease to prevent the possibility of the spleen rupturing (a sudden sharp pain in the upper left quadrant of your abdomen is a symptom that you should seek medical help immediately). A very gradual resumption of physical activity after the patient starts to feel better are important to prevent relapses and to allow faster recovery; a person with infectious mononucleosis usually takes weeks to fully recover and athletes should consult their physicians to determine when their spleen has returned to normal size before resuming competition.

 The virus probably persists in an infected person’s saliva for months and it is recommended that 6 months pass after the infection before the patient donates blood. Although the virus persists in the body, most people get the disease only once.

Notes:

Mumps

Paramyxoviridae

Virus

Transmission: Saliva and respiratory secretions

Vaccine: YES (MMR)

Treatment: Supportive symptomatic therapy

Reportable: YES

Diagnostics: Serologic antibody testing, viral isolation RT-PCR test

Key facts:

 Mumps, also known as parotitis, is a very contagious viral infection of the parotid salivary glands which exist below and in front of the ears. People can acquire the infection simply by being around an infected person who coughs, sneezes or laughs and releases salivary or nasopharyngeal secretions; fomite transmission also occurs. Before the 1960’s mumps were a very common infection in the United States, but since a vaccine was introduced in 1967, the disease is now uncommon here but still exists around the world where vaccine programs are not affordable.

 Most people, when infected with the mumps virus develop a low to moderate grade fever, have neck or ear pain and are tired with a decreased appetite about 2 to 3 weeks after being exposed to the virus; some people never develop signs or symptoms. Eventually, patients with the disease develop the classic sign of mumps infection, a swelling of the parotid salivary glands that gives them a “chipmunk cheek” appearance. Complications from mumps are infrequent but can occur: deafness, encephalitis and meningitis, swelling of the breasts, ovaries and testes have been possible side effects noted. One widely held misconception was that the swollen testes lead to sterility, but this is an extremely rare possibility. Pregnant women who get mumps during the first trimester can suffer miscarriages. Most people who get the mumps see the parotid salivary glands return to normal size in about a week to 10 days; the two sides often do not swell simultaneously. Sometimes only one parotid salivary gland will swell, leading to a misconception that people can get mumps twice; immunity to the mumps virus is usually lifelong and people do not usually get the infection twice. People with mumps infections, whether sick or not, can be contagious for about 3 days before they show signs of illness to about 7 to 9 days after the signs end.

 There is no treatment for mumps, and rest, drinking fluids and warm compresses on any parts of the body that are swollen help to ease the discomfort. Antibiotics do not work since this is a viral infection and as will all viral infections in children, aspirin is not advisable.

Notes:

Norovirus Gastroenteritis

Caliciviridae

Virus

Transmission: Fecal-oral

Vaccine: NO

Treatment: Fluid replacement therapy for dehydration

Reportable: NO

Diagnostics: RT-PCR assays on stool and vomitus

Key Facts:

 Norovirus infections are one of the most common causes of what we often call gastroenteritis, food poisoning or the “stomach flu” (although influenza virus is not involved). Discovered in Norwalk, Ohio in the 1960’s, noroviruses used to be more commonly known as the Norwalk virus. Many people know of this virus because it seems to occur often on cruise ships, but it occurs worldwide and is commonly acquired through the fecal-oral route of transmission and from contaminated water, especially on raw shellfish and from salads.

 The virus is transmitted in the vomit and feces of infected people and has an incubation period of between 12 and 48 hours. Most people feel nauseous, vomit frequently and have stomach cramps and diarrhea; in some patients, mild flu-like symptoms also occur. The infection usually runs for 1-2 days, after which the patients recover completely; reinfection can occur. In people with weak immune systems, including the very young and old, the dehydration that occurs due to the infection may need to be addressed by a physician. People with Norovirus gastroenteritis should be considered contagious for from 3 days until 2 weeks after recovering from the infection.

 It is imperative that people wash their hands frequently, especially when in nursing homes, day care centers and when coming into direct or indirect contact with people who have diarrhea. Bleach and bleach based cleaners are excellent disinfectants for household items that become contaminated with the virus. Fruits and vegetables should be thoroughly washed and shellfish should be steamed before eating. Any clothing or bedding that comes in contact with a patient having Norovirus diarrhea and vomiting should be washed in hot water and soap. The CDC has approved the use of alcohol-based sanitizers for the hands in conjunction with regular hand washing to prevent the spread of Norovirus gastroenteritis.

Notes:

Parainfluenza

Paramyxoviridae

Virus

Transmission: Respiratory, from aerosol droplets of from direct contact

Vaccine: NO

Treatment: Symptomatic; severe cases may require oxygen therapy

Reportable: NO

Diagnostics: Virus culture and identification of respiratory secretions; serum antibody titers

Key Facts:

 Human parainfluenza viruses are a common cause of upper and lower respiratory infections and are probably the most common cause of croup (bark like cough, wheezing and shortness of breath) in children. There are four human parainfluenza viruses (HPIV), type 1 causes most cases of croup in children. Types 1, 2 and 3 probably are the second most common cause of lower respiratory tract infections in children, besides respiratory syncytial virus (RSV). As with RSV, the infection is spread through respiratory aerosol droplets and secretions that come in contact with the eyes, nose and mouth.

 Many cases of HPIV infection are mild and may be thought of as a cold. Most frequent in the fall and winter, HPIV appear to cause more severe symptoms in infants. The HPIV incubation lasts from 1 to 7 days and signs and symptoms usually include congestion, chest pain, a barking cough, runny nose, wheezing and a sore throat. Most children by the time they are five years old have been infected with one or more of the HPIV’s. Infections can reoccur and each time the signs and symptoms of disease generally lessen. Most cases of the infection are so mild they don’t require treatment. As with other respiratory illnesses, it is best to wash your hands regularly with soap and water and don’t share items used by people with respiratory tract disease symptoms in order to prevent infection.

Notes:

Peptic Ulcers

*Helicobacter pylori*

Bacteria

Transmission: Fecal-oral

Vaccine: NO

Treatment: Antibiotics, antacids, bismuth subsalicylate

Reportable: NO

Diagnostics: Upper GI series or gastroscopy, followed by a serum antibody test, breath test, stool test or tissue test

Key Facts:

 For many years, peptic ulcers, which are erosions of the stomach (gastric ulcers), small intestine (duodenal ulcers) or esophageal lining that cause open sores, were thought to be due to stress. Patients were put on bland diets to treat their ulcers. In the 1980’s it was discovered that many patients with peptic ulcers had a stomach infection with a bacterium named *Helicobacter pylori* and the treatment of many patients with peptic ulcers changed; approximately 75% of all peptic ulcer patients are now treated with antibiotics and medications to reduce the production of stomach acid. People with peptic ulcers should have their doctor rule out other causes for ulcers, such as the overuse of aspirin, non-steroidal anti-inflammatory medicines (NSAIDs), or other diseases.

 *Helicobacter pylori* is transmitted from person to person through feces which contaminates water and food. Patients with peptic ulcers can suffer from abdominal pain, bloating, heartburn, nausea and vomiting, a feeling of stomach fullness, weight loss and decreased appetite, and they may vomit blood and have tarry looking stools. The problem can become so severe that it can lead to perforations or obstructions of the organ linings and death. Patients with peptic ulcers should stop drinking alcohol and caffeinated beverages and stop smoking cigarettes which can aggravate an ulcer; stress and spicy foods can aggravate the condition but they do not cause peptic ulcers. With treatment, ulcers are usually cured in 1 to 2 weeks.

 The Australian scientists who discovered that *Helicobacter pylori* was a leading contributor to the development of peptic ulcers went on to win the 2005 Nobel Prize in Medicine, but today controversy exists as to whether these bacteria alone are responsible for most peptic ulcers or is there a dual affect between stress, other factors and these bacteria that cause the disease; many people with *Helicobacter pylori* in their stomachs have no ulcers.

Notes:

Pinkeye

Many bacterial, viral, allergic and chemical causes of pinkeye exist.

Bacteria and Viruses

Transmission: Contact with infected people and fomites.

Vaccine: NO

Treatment: Antibiotics for bacterial causes; viral causes go away on their own.

Reportable: NO

Diagnostics: Examination of eyes, Swab of conjunctiva for culture and analysis.

Key Facts:

 Pinkeye, also known as conjunctivitis, causes redness and swelling to occur to the conjunctiva, the mucous membranes that cover the eye and eyelids; commonly itching, eye pain, sensitivity to light and a discharge are associated with the infection. Although pinkeye can be caused by many things, we are interested in the bacterial and viral causes in this description. Both viral and bacterial conjunctivitis are highly contagious, very common and usually go away in about a week without treatment but it is advised that your doctor be called so that he or she can recommend home treatment and determine if an office visit is necessary. The infection can occur in one or both eyes and usually causes no long term problems.

 Viral pinkeye is typically associated with upper respiratory infections, like colds, and is accompanied by a watery discharge, swollen eyelids and sensitivity to light. The infection usually gets better in less than one week and home treatment for most viral causes of pinkeye is all that is usually needed; antibiotics do not work against viral pinkeye. Because viral pinkeye can lead to a corneal infection, it is recommended that cases that do not resolve quickly be seen by an ophthalmologist. Herpes virus can cause pinkeye and can be treated with anti-viral medications. When a viral cause of pinkeye is suspected, return to school or work can occur when the patient’s symptoms begin to get better in about 3 to 5 days.

 Bacterial pinkeye can be caused by many bacterial types too and usually patients with this form of pinkeye have a green-yellow thick discharge, eye pain, redness and swelling. Commonly the eyelids are stuck shut when the patient wakes in the morning after sleep; this problem can be easily relieved by gently and carefully applying a warm washcloth to “unstick” the eyelids and remove the dried, crusty discharge. Bacterial pinkeye can respond to antibiotics and children and adults with this type of pinkeye can return to school or work once the prescription antibiotics are shown to cause an improvement in the condition. Babies can get pinkeye from infections from the mother they receive during delivery; antibiotics are routinely applied to the eyes of newborns to prevent this.

 To prevent the spread of pinkeye it is recommended that people wash their hands with soap and water when coming in contact with infected patients and objects that they touch. Do not share eye drops, tissues, or eye makeup with anyone. Washcloths, towels, and bed linens used by the patient should be washed daily, in hot water, apart from the clothes of other family members. The infection can occur when swimming in water played in by infected children.

NOTES:

Pinworms

*Enterobius vermicularis*

Nematode (roundworm)

Transmission: Anal-oral

Vaccine: NO

Treatment: Albendazole, mebendazole or pyrantel pamoate.

Reportable: NO

Diagnostics: Cellophane tape test to look for worm eggs microscopically

Key Facts:

 Pinworms are a very common and easily transmitted roundworm infestation, also known as threadworms or seat worms. The worms are less than half an inch in length and can be seen coming out the anus of an infected person, most typically a child, during the night when the person is sleeping; they are not dangerous. The adult mother pinworm lays her eggs on the perianal skin with a glue-like substance that causes itching. Although some children show irritability and sleeping problems, most people with pinworms have no noticeable symptoms other than anal itching.

 Pinworms are transmitted from person to person only, the infestation is not zoonotic. When a person with pinworms scratches their anus, the eggs become dislodged under the fingernails or in the clothing. Pinworm eggs can survive for 2 weeks in the environment and can be found on dust particles. Most people get the infestation when they come in contact with contaminated fingers (usually children) or contaminated surfaces. The time between egg ingestion and when the mother pinworm begins laying new eggs is from 1 to 2 months. Frequently multiple members of the same household and many children in day care centers become infested. Treatment is simple and involves oral medication that must be taken twice, at a two week interval to reduce the chance of reinfection. All people in close contact with the infested person should also be treated.

 Measures that should be taken to prevent pinworm infestation include washing your hands before eating, when playing with other children and after using the toilet, cutting your fingernails short and discouraging chewing your nails and scratching your bottom. When pinworms have been diagnosed, pajamas and bed linens should be washed every week, the floors and carpet should be vacuumed regularly, morning bathing is recommended to wash away any newly laid eggs and clean underwear must be worn daily.

Notes:

Plague

*Yersinia pestis*

Bacteria

Transmission: Flea bites, inhalation, contact with infected animals

Vaccine: NO

Treatment: Antibiotics, supportive therapy

Reportable: YES

Diagnostics: Blood, sputum and lymph node cultures for bacteria

Key Facts:

 When you play with your children and dance in a circle singing “ring around the rosy, pocket full of posies, ashes, ashes, we all fall down,” do you know you are singing about people dying from the plague? There have been historical references to the plague for centuries where millions of people in Europe and Asia have died in epidemics. The plague that is specifically caused by a bacterium has been called many names, including septicemic (black) plague, the bubonic plague and pneumonic plague, and the disease still exists today. The plague is a zoonotic infection of rodents, like rats, and can be spread to humans through the bites from rat fleas; lice and ticks can also be vectors and there are many species of fleas that carry the disease. Fleas carrying the bacteria can also be found on other animal hosts, such as cats and dogs, and can transmit the infection when the flea bites. Infection can also occur when inhaling aerosolized particles from a person with the pneumonic form of the disease and from contact with infected animal tissues and fluids.

 It usually takes from 2-5 days to show signs and symptoms of the plague, although in pneumonic plague the onset may be only hours. Painful, swollen lymph nodes called buboes typically occur in the groin, armpits and neck, a high fever with chills, headache, muscle aches and seizures can occur in bubonic plague patients. In pneumonic plague, there is a bloody frothy sputum accompanied by coughing and labored, difficult breathing. With the black plague, the bacteria enter the circulatory system and cause bleeding disorders, with red and then black splotches seen under the skin as capillaries burst; fever, diarrhea and vomiting, falling blood pressure and organ failure also can occur.

 Treatment of plague patients needs to be immediate with antibiotics. Sometimes respiratory support and fluid therapy are also needed. Untreated plague is often deadly, particularly if the patient has pneumonic plague; pneumonic plague patients need to be in strict isolation for at least 2-3 days after treatment starts or until the infection is cured. Currently there is no commercially available vaccine approved for the plague and there is no requirement for vaccination to enter any country; the vaccine that used to be available has been taken off the market and a new vaccine is in development. In the case you or your pet does come in contact with a person with the infection, prophylactic antibiotics should be given.

Notes:

Pneumocystis pneumonia (PCP)

*Pneumocystis jirovecii*

Fungus (unicellular)

Transmission: Inhalation of fungus

Vaccine: NO

Treatment: Trimethoprim-sulfamethoxazole (TMP-SMX), pentamidine, primaquin, atavaquone, dapsone

Reportable: NO

Diagnostics: Special stains of sputum or lung tissue are needed to detect the fungus.

Key Facts:

 *Pneumocystis jiroveci(i)* is a unicellular fungus found in the environment that usually has no affect on people unless they have a weakened immune system; early classification schemes misidentified it as a protozoan and it was formerly named *Pneumocystis carinii*. In the early days of the HIV/AIDS epidemic, the opportunistic fungus was the primary cause of death for many AIDS sufferers. Because the infection was uncommon, the sudden increase in the numbers of patients seen with the disease alerted the medical community to the fact that an epidemic, caused by the then unknown HIV, was occurring; PCP is still one of the most common diseases seen in AIDs patients.

 People with PCP inhale the fungus from the environment, which possibly exists in the soil; it is not thought to be spread person to person through respiratory droplets or through sex. Once infected with the fungus causing PCP the patient will have a fever, a dry unproductive cough and difficulty breathing with a tightness felt in the chest particularly after exercise. People with HIV/AIDS whose CD4 T lymphocyte count goes below 200 cells/µliter are usually put on prophylactic antimicrobial medications to prevent getting the infection. Other immune compromised patients must also be aware that the infection can occur in them too and it can be cause severe pneumonia that can lead to death. Antimicrobial medications and corticosteroids appear to work well in severe cases of PCP. There is no long term immunity to the infection, therefore patients can be reinfected and should be put on preventative antimicrobial medications as needed.

Notes:

Polio

Picornaviridae

Virus

Transmission: Fecal-oral

Vaccine: YES (IPV- inactivated polio vaccine and OPV- oral polio vaccine)

Treatment: Supportive therapy, there is no cure for polio

Reportable: YES

Diagnostics: Culture of throat or stool samples; blood antibody tests

Key Facts:

 Polio has been a disease known to man for centuries that causes paralysis due to damage caused to the nervous system. In the early part of the 20th century, a polio epidemic scared much of the United States and lead to the discovery of a vaccine to combat the three virus serotypes that cause polio. Jonas Salk’s discovery of an inactivated (killed) polio vaccine in the 1950’s was the major breakthrough many Americans had hoped for to combat this cruel disease. In the 1960’s, Albert Sabin developed an oral (weakened (attenuated) live virus). By the late 1970’s, wild polio, polio acquired from naturally occurring viruses in nature, was eradicated in the United States and today, except for a few countries in Africa and Asia, the disease has been eliminated from most countries of the world through a vaccine program lead by the World Health Organization.

 Wild polio is contracted when fecal material from an infected individual enters the mouth of another person, usually on unwashed hands or eating utensils and occasionally from water contaminated with the virus. In almost all people who get infected with the virus, there are no signs or symptoms, especially in the very young. In people with signs and symptoms, many suffer from abortive polio which causes mild flu-like symptoms. An infrequent complication of infection is non-paralytic polio that leads to meningitis; patients with this form of polio usually show sensitivity to bright light and stiffness of the neck. In abortive and non-paralytic polio recovery is usually complete. In very few patients who are infected with polio, the virus leaves the intestines and enters the circulatory system and attacks nerve tissue; depending on what nerves are damaged, some patients have polio that affects their arm and leg muscles and others have polio that affects their breathing muscles; the more serious complications from polio appear more often in older children and adults. During the height of the polio epidemic in the United States, leg braces and iron lungs (for assisted breathing) were used to assist polio patients. It takes approximately 1 to 2 weeks from the time of infection to begin showing signs and symptoms. The infection can be spread for as long as 6 weeks from the stool of an infected person and in some patients the paralysis can last for a lifetime. In some cases of polio (about 25% of cases), patients suffer from what is called post-polio syndrome, where they may become extremely fatigued, have muscle weakness and sometimes paralysis again, that occurs decades after the person acquires the initial disease.

 Since the elimination of wild polio in the United States in 1979, a few cases of polio have been traced back to the oral polio vaccine (OPV), which can mutate and revert to the disease causing strain of the virus; because of this the CDC now recommends all polio vaccines given in the U.S. be the inactivated polio vaccine (IPV) which cannot cause polio. The vaccine will be given until all wild polio viruses are proven to be eradicated in humans through the worldwide vaccine program.

Notes:

Pseudomonas infections

*Pseudomonas aeruginosa* and other *Pseudomonas spp.*

Bacteria

Transmission: Contact transmission from air, water, soil, animals, vegetation

Vaccine: NO

Treatment: Antibiotics (Gentamycin in combination with tobramycin or carbenicillin may be necessary)

Reportable: NO

Diagnostics: Bacterial culture of infected sites

Key Facts:

 *Pseudomonas* bacteria are ubiquitous opportunistic pathogens which are not a problem for most people with healthy immune systems. In hospitalized patients as well as in those patients with cancer and cystic fibrosis, *Pseudomonas* can cause a fatal infection. *Pseudomonas* is a common nosocomial infection and is notoriously difficult to eliminate from the environment as well as in patients, as it is resistant to many disinfectants and antibiotics. The bacteria thrive in moist places, including sinks, mops, toilets, foods, plants, and even in some antiseptic solutions and under-chlorinated pools.

 *Pseudomonas* can infect any part of the body and even in healthy people it causes swimmer’s ear and hot tub folliculitis, which causes an itchy, pimply rash around areas where swimming clothes rub on the skin; both infections generally cause no long term problems in healthy individuals. *Pseudomonas* infections occur commonly in diabetics and in the ear such infections can lead to pain and nerve damage in these patients. *Pseudomonas* can cause pneumonia, as well as infections of the urinary tract, cornea, and heart valves. Local skin infections can become generalized and spread through the body to produce fatal bacterial blood infections, especially in burn patients. Patients on long term broad spectrum antibiotics also are at high risk of developing *Pseudomonas* infections. The bacteria can cause infections on the external parts of the body, but when internal body parts are infected, aseptic technique, antiseptics, disinfectants and sterilizing procedures must be questioned by infection control committees in hospitals. Respiratory and urinary tract infections are commonly due to *Pseudomonas* in hospitals, where the bacteria can be transferred from patient to patient by the hospital staff.

 As with many bacterial infections, *Pseudomonas* infections that enter the body commonly cause pain at the site of infection and often cause fever. Pus, produced in *Pseudomonas* infections, is commonly tinted by a blue-green pigment produced by the bacteria and has a fruity aroma. Combinations of antibiotics, often intravenous for serious internal infections, are often necessary to treat *Pseudomonas* infections and when bad enough some infections require surgery to remove or drain the infection.

 To prevent *Pseudomonas* infections, hospital staff must be aware of their aseptic technique. When bathing in swimming pools, hot tubs and whirlpool baths make sure the water is properly chlorinated, and since *Pseudomonas* grows well in warm water, it is recommended that people shower and remove bathing suits after using the pool or hot tub.

Notes:

Psittacosis

*Chlamydophila psittaci* (in the past it was classified as *Chlamydia psittaci*)

Bacteria

Transmission: Respiratory (dried secretions from infected birds are the source)

Vaccine: NO

Treatment: Antibiotics (Tetracycline and chloroamphenicol)

Reportable: YES

Diagnostics: Serum antibody tests, PCR testing, culturing these bacteria should only be done in a Biosafety laboratory.

Key Facts:

 Psittacosis, also known as parrot fever and ornithosis, is a reportable zoonotic disease acquired by inhaling dried bird secretions, such as feces or nasal discharge; many birds with the infection are asymptomatic. Psitticine birds such as parrots, macaws, cockatiels and parakeets are the most frequent sources of infection among pet birds while ducks, pigeons, turkeys and a variety of wild birds can also harbor the bacteria; people who work with or own birds are most at risk. Infected birds can appear healthy but when stressed birds tend to shiver, have labored breathing, lose weight and have diarrhea.

 People who acquire psittacosis typically have flu-like symptoms that may progress to pneumonia from 5 to 14 days after infection; the infection can sometimes cause severe pneumonia and on occasion can be fatal. The disease can on occasion spread to other parts of the body. In the United States, the disease is very rare and is almost impossible to spread from person to person. The infection is treatable with antibiotics when caught in time. To prevent getting infected, bird cages should be cleaned on a regular basis.

Notes:

Q fever

*Coxiella burnetii*

Bacteria

Transmission: Contact with body fluids of infected animals or inhalation of the dried secretions of these animals.

Vaccine: YES (Q-Vax- a whole cell inactivated vaccine manufactured in Australia; not available commercially in the United States)

Treatment: Antibiotics (doxycycline, sometimes combined with other antibiotics)

Reportable: YES

Diagnostics: Serum antibody tests

Key Facts:

 Q fever is a zoonotic disease of cattle, sheep and goats which can also infect pets and other animals. In ruminant herd animals, such as sheep and goats, it may cause abortions in pregnant females, but in humans, Q fever can cause flu like symptoms that can lead to pneumonia; very rarely does Q fever result in death. The name Q fever originated in Australia and the Q stands for “query” because the cause of the infection was unknown. Humans acquire the bacterial infection primarily through exposure to the urine, feces, milk, semen and birthing fluids of sheep and goats. Inhalation of dried body fluids on dust particles is a common method of exposure since the bacteria resist drying as well as heat and may disinfectants. Human to human transmission is considered rare.

 Not all people infected with *Coxiella burnetii* show signs and symptoms of the disease. About half of infected people will become sick about 2-3 weeks after infection when they demonstrate a high fever that lasts for 1 to 2 weeks as well as signs which imitate the flu and sometimes gastrointestinal illness. Pneumonia and hepatitis can occur as a result of the disease. In immunocompromised patients, the disease may cause a chronic infection which often can damage the inner lining and valves of the heart. For patients with typical Q fever, recovery is usually complete within a few months without treatment; treatment with antibiotics speeds up the time of recovery. Recovery appears to provide lifelong immunity and there is a vaccine available which is manufactured in Australia which is given to people at high risk who work with animals that can transmit Q fever; the vaccine is not available commercially in the United States.

Notes:

Rabies

Rhabdoviridae

Virus

Transmission: Infected mammal bites, scratches or saliva that contacts the mucous membranes

Vaccine: YES (3 different vaccines approved in the U.S.: HDCV, RVA and PCEC)

Treatment: Wound care, tetanus vaccine, Human Rabies Immunoglobulin (HRIG) and rabies vaccines

Reportable: YES

Diagnostics: None for the infected patient, there are tests that can be performed on animal brains.

Key facts:

 Rabies, also known as hydrophobia, is a zoonotic infection caused by a virus known as lyssavirus. All mammals can be sources of rabies. In the United States, raccoons are the most common carriers of rabies, but bats are the most common source of rabies infections in humans. All domesticated animals should be vaccinated; cats are the most frequent source of rabies infections acquired from domesticated animals in the United States but dogs account for most domestic animal cases of rabies worldwide. Mammals like squirrels and rabbits rarely are at risk of contracting and transmitting rabies.

 Most cases of rabies occur when the saliva of an infected animal gets into a bite or scratch or in an open wound, the eyes, nose or mouth; inhalation of large amounts of the virus, like that which can occur in caves, can also be a rare source of infection. Usually there is a tingling sensation, sometimes with pain and itchiness shooting from the site of the bite, where the virus enters the body; chills, fever and muscle aches may accompany these sensations. Depending on how far the virus needs to travel to the brain, it can take 10 days to several years before signs and symptoms of rabies appear. High fever, confusion, agitation, seizures and coma are common symptoms in rabies patients; spasms of the breathing muscles can also occur when the patients are shown water or when air is blown at them; there is no cure for rabies once these symptoms appear and paralysis, coma and death soon occur afterwards.

 If bitten by an animal, the wound needs to be washed thoroughly with soap and water and emergency room treatment should be sought promptly. The local animal control authorities should be notified and if the animal is owned, the vaccine history should be obtained. If the animal is not known to the bite victim, the animal should not be approached by anyone, to capture the animal, other than the local animal control personnel who can capture and test the animal for rabies. Dogs, cats and ferrets with unknown vaccine history can be kept for 10 days to observe for symptoms, other animals that can be euthanized can have their brains tested for rabies by the local health authorities. Bats that enter the home should be tested for rabies. Animals which should be considered suspicious of having rabies may appear sick and confused, they can be vicious or friendly or they may appear normal; nocturnal animals or animals that avoid humans that behave contrary to their typical behaviors should be suspect as well. Emergency treatment of potential rabies bites consists of disinfecting and treating the wound as well as getting a tetanus vaccine. The animal causing the bite should NOT be brought to the emergency room. A human rabies immune globulin (HRIG) injection will be given to give immediate short term protection against rabies if you have not been previously vaccinated for rabies. A series of rabies vaccines will also be started, which can begin a series of 2 or 5 vaccines depending upon whether you have ever been vaccinated for rabies in your lifetime. The vaccines are no longer given in the abdomen, they are safe for pregnant women and they will prevent the patient from getting rabies.

Notes:

Respiratory Syncytial Virus

Paramyxoviridae

Virus

Transmission: Respiratory through aerosol droplets or direct contact

Vaccine: NO

Treatment: Symptomatic treatment; in severe disease: aerosolized Ribavirin

Reportable: NO

Diagnostics: Antigen detecting assays; virus isolation; rise in serum antibodies

Key Facts:

 Respiratory syncytial virus (RSV) is one of many viruses responsible for causing cold like symptoms in humans, but it is also the most common cause of bronchiolitis and pneumonia in children less than one year of age. The virus is very contagious and spreads through respiratory droplets in the air or by viruses that land on inanimate objects. By the time children are two years old, they have had exposure to RSV and most cases are mild and need only symptomatic treatment such as acetaminophen to reduce a fever; less than 2% of children require hospitalization and these are usually infants less than 6 months old. In hospitalized babies, aerosolized antiviral medications like Ribavarin are often used to treat the disease along with oxygen therapy until the disease has run its course.

 Outbreaks of RSV typically occur from late fall to early spring and the virus has an incubation period of from 2-8 days, during which time the virus can be spread. Children with severe respiratory infections with a fever should be kept home until the symptoms have resolved; the illness usually lasts from 3 to 8 days. Since the virus is spread from infected people, typically when they cough or sneeze, to other people when they touch their nose or mouth, washing your hands with soap and water should be a common occurrence and personal items such as cups and utensils should not be shared; the virus can only last for several hours in the environment and it is very susceptible to soap and water as well as disinfectants. There is no vaccine for the infection but a vaccine is currently being sought. Usually people have no long term immunity and can be reinfected throughout their lifetimes, but each reinfection usually produces milder signs and symptoms each time.

Notes:

Ringworm

*Microsporum, Trichophyton* and *Epidermophyton* species

Fungus

Transmission: Contact transmission

Vaccine: NO

Treatment: Multiple topical and oral medications are used to treat ringworm.

Reportable: NO

Diagnostics: Wood’s lamp; microscopic examination of skin scrapings, Dermatophyte test media

Key Facts:

 Ringworm is NOT a worm, as many people mistakenly think. Ringworm, also known as tinea, is a contagious infection of the hair, skin and nails that is due to a fungal infection. In people of all ages, but occurring more often in children, ringworm can infect the hair and skin of the head (tinea capitis), the body (tinea corporis), the groin (tinea cruris or jock itch), the feet (tinea pedis or athlete’s foot) and the nails (tinea unguinum). Ringworm is spread directly from other people and indirectly from the items that people use, such as hats, blankets, brushes, clothing, showers, telephones and pools. Ringworm spores can be found in soil and the disease can be zoonotic, spreading from many animals, such as dogs, cats, and horses, to humans. Some people seem to be genetically more susceptible than others to getting ringworm and due to the fact that there are several different types of fungi that cause ringworm, patients can get ringworm again, even after successful treatment.

 There are several genera of fungi that cause ringworm and they have an incubation period of between a few days to a couple of weeks. Ringworm of the skin usually appears as a reddened scaly rash that eventually looks like a ring on the skin surface; it may be itchy. Ringworm of the scalp usually is noticed when hairs break off easily and a scaly patch of hair loss appears. Ringworm of the foot results in burning scaly skin that cracks, usually around or between the toes. Ringworm of the nails causes the nails to become yellow or chalky, thick and brittle. Treatment of most ringworm infections can usually be done at home with over the counter topical medicines containing miconazole (Tinactin) or clotrimazole (Lotrimin). Ringworm that doesn’t respond to home treatment in 1-2 weeks should be seen by a doctor. Nail and scalp ringworm are more difficult to treat and usually require an oral prescription such as terbinafine (Lamasil) which needs to penetrate the hair follicles and nails to be effective.

 When a person or pet comes down with a ringworm infection, it is important to prevent others from getting infected. People with ringworm should keep their skin dry and clean and they should wash their clothes and bed linens daily. Others, to prevent getting ringworm should keep your skin clean and dry, wear protective footwear in public showers, shampoo after haircuts, never share personal clothing items and avoid petting pets with bald patches.

Notes:

Rocky Mountain Spotted Fever

*Rickettsia rickettsii*

Bacteria

Transmission: Tick-borne

Vaccine: NO

Treatment: Antibiotics (doxycycline, tetracycline or chloramphenicol)

Reportable: YES

Diagnostics: Rising IFA antibody titers seen in blood samples taken several weeks apart; skin biopsy of rash

Key Facts:

 Rocky Mountain spotted fever (RMSF), or tick borne typhus, is a zoonotic infection spread by several types of ticks that originally was discovered in Idaho in the late 1800’s where it was called “black measles.” The name can be misleading though because RMSF occurs most commonly today in the southeastern United States, from North Carolina to Oklahoma.

 The infection is due to a bacterium that typically causes flu—like symptoms 2 to 14 days after being bitten by a tick. Gastrointestinal signs of nausea, vomiting and diarrhea can also be present. A few days after the fever begins, a spotted pinkish-red rash first appears on the wrists and ankles and then spreads to cover the body; eventually the rash make look like bruises or patches of blood under the skin. Most, but not all, people with RMSF have a rash. In severe cases of RMSF, multiple organs can be affected and death can occur without antibiotic treatment. People bitten by ticks, with the first signs of RMSF should be put on antibiotics, even before tests results return, to have the best chance for successful treatment.

 Recovery from RMSF provides lifelong immunity, but other diseases can be acquired from tick bites, so hikers and those with the potential to be exposed to ticks should always practice tick prevention measures; some people with RMSF never know they were bitten by a tick. RMSF is not communicable from person to person. When walking in tick infested areas, wear light colored long sleeve shirts and long pants and tuck the pants into your socks; insect repellants containing DEET should be used, following the label directions. When ticks are found on the body be sure to remove them with tweezers, grabbing gently at the tick head and pulling slowly straight out from the skin; if you must use your fingers, it is best to wear gloves. Never burn, use alcohol on or try to smother a tick with oil or petroleum jelly; never crush a tick with your fingers, since the juices from the tick contain the bacteria which can enter through cuts or abrasions. Ticks must be attached for several hours to spread the infection so immediate removal is important. RMSF can also affect dogs and cats, so household pets should also be checked periodically for ticks, especially when coming in from outdoors.

Notes:

Rotavirus Diarrhea

Reoviridae

Virus

Transmission: Fecal-oral

Vaccine: YES (RotaTeq (approved in the U.S.) and Rotarix)

Treatment: Oral fluid electrolyte therapy

Reportable: NO

Diagnostics: Latex agglutination and enzyme immunoassay of feces

Key facts:

 Rotavirus diarrhea, also known as infantile diarrhea, is one of the most common causes of infant and child diarrhea in the United States and worldwide. Although adults can get infected, children suffer the most from the disease, with many American children going to hospitals and hundreds of thousands of children around the world dying due to dehydration that is a result from the disease.

 Typically in babies and young children, rotavirus strikes when children come in contact with fecal material or something contaminated by it. Day care centers are a common source of infection, but most children will have had rotavirus diarrhea before they are 5 years of age. The viral infection has an incubation period of about 2 days and causes watery diarrhea, nausea, vomiting, abdominal pain and fever in young children that lasts from 3 to 10 days; in adults the signs and symptoms are usually milder and reinfections can occur. Treatment of the disease includes rehydration therapy and usually can be done at home. Always call your pediatrician when your baby has diarrhea to get their advice on diet and measures to combat dehydration. When diarrhea occurs for more than 2 days, dehydration can become a problem and oral electrolytes, such as Pedialyte or Infalyte, should be given to the child; sports drinks, soda and fruit juices are not advisable, since they can make the diarrhea worse. Nursing mothers should continue nursing. Since the diarrhea is due to a virus, antibiotics are not helpful in treating this form of diarrhea. Any child showing signs of severe dehydration (lethargy, sunken eyes, lack of urination for several hours, dry mouth and irritability) should be brought to a doctor immediately for intravenous fluids; this measure can save the baby’s life.

 The main advice in preventing rotavirus infections is to maintain proper personal hygiene and environmental cleanliness. Children should be trained to wash their hands as a part of potty training. Workers in day care and hospital settings must wash their hands and properly disinfect fomites that infected people come in contact with. Children with the disease should be considered contagious for 10-12 days from the time diarrhea begins; it is good advice for everyone who comes in contact with babies to wash their hands frequently. In hospitals, patients with rotavirus infections should be isolated. Currently there is a vaccine for babies, RotaTeq, which is approved for use in the United Sates.

Notes:

Roundworms (Ascariasis)

*Ascaris lumbricoides*

Nematode (roundworm)

Transmission: Ingestion of food or water contaminated with human feces containing Ascaris eggs

Vaccine: NO

Treatment: Albendazole, Mebendazole, Pyrantel pamoate, Piperazine

Reportable: NO

Diagnostics: Worms may be seen passed in stools or in vomit; worm eggs can be seen when feces is examined microscopically. As with many helminth infestations, peripheral eosinophilias are common.

Key Facts:

 The animal phylum Nematoda is the phylum that represents worms that are generically called “roundworms.” Hookworms, pinworms and dog heartworms are all generally called “roundworms.” There is one parasitic nematode though, that is specifically called the human roundworm, which causes ascariasis. The infestation is primarily a problem that affects over one billion people, primarily in Asia and Africa.

 In most cases, ingestion of roundworm larvae occurs after a person touches something that has the roundworm eggs on its surface and puts their fingers into their mouths or when a person eats foods contaminated with the worm eggs. In the intestine, the eggs hatch and burrow through the lining of the intestine. After being carried by the blood, the larvae arrive in the lungs where they break through the alveolar membranes. The larvae then crawl up the trachea, where they are then swallowed. In the intestines, the larvae mature, as they attach to the intestinal wall, and mate. The female can produce hundreds of thousands of eggs per day.

 Most people have mild to no signs and symptoms, but diarrhea can occur when large numbers of worms infest the intestines. Worms in the gastrointestinal tract can block the bile and pancreatic ducts. The worms can migrate to other organs of the body inappropriately. In the lungs, large numbers of worms can lead to pneumonia. During surgery, cases have been known to occur where adult roundworms have been seen to exit the mouth and nose of the patient.

Dogs and cats also get roundworms, but their roundworm infestations are not the same species of roundworms that infest humans. When a dog or cat roundworm enters a human, the larvae can wander through the body causing “visceral larva migrans.” This can cause damage to organs like the eyes, brain and heart of the human.

To prevent getting roundworms, proper disposal of feces is necessary. Always wash your hands as well as fruits and vegetables before eating. Also, clean up after your dog or cat goes to the bathroom. A good rule of thumb to follow after touching any animal is to wash your hands.

Notes:

Rubella (German Measles)

Togaviridae

Virus

Transmission: Respiratory aerosol droplets; urine from children with Congenital Rubella syndrome

Vaccine: YES (MMR)

Treatment: Symptomatic

Reportable: YES (both Rubella and Rubella congenital syndrome are reportable)

Diagnostics: Rubella antibody test

Key Facts:

 German measles, commonly called “3 day measles” is caused by the rubella virus and is not the same as red measles that is caused by the rubeola virus. German measles is typically a more mild disease, except for unborn children who can be infected by the virus when their mother is exposed, usually during the first trimester of pregnancy; this exposure can lead to congenital rubella syndrome in the newborn child causing mental retardation, cataracts, deafness, and heart defects. Since 2004, the Centers for Disease Control declared that German measles no longer exists in the United States, but vaccination must be continued since the disease still exists in many parts of the world and visitors from other countries may bring the disease with them.

 German measles often is so mild that parents may not know their children have it; the incubation period for the disease is generally 2-3 weeks after exposure to the virus. In people who do show signs and symptoms, a mild fever, tender lymph nodes, a light pink rash that begins on the face and spreads down to the rest of the body which lasts about 3 days, headache and a stuffy nose with inflamed eyes usually are reported by patients; young women often report having joint pain. Bed rest, fluids and acetaminophen (never aspirin) can be given to a person infected with rubella; any pregnant woman should avoid these people and if she is exposed to a person with rubella, she needs to immediately report that information to her obstetrician. The virus can be spread from one week before to one week after the rash appears and infected people who don’t develop a rash can still transmit the virus in respiratory droplets. Babies who have congenital rubella syndrome can still spread the viruses for over one year through their urine and also through respiratory droplets; they need to be isolated in the newborn nursery.

 The MMR vaccine is commonly given to children beginning at 12 months of age and has few reported side effects, but the vaccine should not be given to pregnant woman or any woman planning on becoming pregnant within one month of getting the vaccine. A common misconception about the MMR vaccine, one that has never been proven, is that the MMR vaccine can cause autism in children.

Notes:

Salmonellosis

*Salmonella enterica* subspecies enterica with its numerous serovars

Bacteria

Transmission: Fecal-oral

Vaccine: NO

Treatment: Supportive, antibiotics and IV fluid therapy may be needed in severe cases

Reportable: YES

Diagnostics: Bacterial culture of feces

Key Facts:

 Most people never consider that the water they drink, the fruits and vegetables they eat and the pet snake they play with can be sources of salmonellosis (salmonella food poisoning), because they typically think this is a food poisoning we get from undercooked eggs and chicken. In fact, salmonella bacteria are found in many different animals, from birds to mammals and reptiles, and can be spread when we use animal wastes as fertilizer for growing fruits and vegetables as well as to dairy products where feces can contaminate the milk.

 People who get salmonellosis have diarrhea, abdominal cramps and fever from 12 hours to 3 days after eating contaminated food; recovery usually occurs without treatment in from 5 to 7 days. For infants, the elderly and those with underlying immune system deficiencies, the infection can be more serious leading to dehydration; these cases need hospitalization and intravenous fluid therapy. In some cases, the bacteria leave the intestines and enter the blood stream where they can attack other organs of the body and lead to death; these cases require hospitalization and the use of antibiotics to save the patient. In rare cases, a chronic arthritic condition called Reiter’s syndrome can occur in patients with salmonellosis.

 To prevent salmonellosis, the major concept is washing your hands and cooking the food thoroughly. When preparing food, your hands, utensils and cutting surfaces must be cleaned often to prevent cross contamination with the salmonella bacteria, which can come from human or animal feces. Wash your hands after handling all pets, especially reptiles such as snakes, iguanas and turtles. Wash your hands after going to the restroom, after touching meat and between handling different types of foods. The second aspect of preventing salmonellosis is to cook food thoroughly; appropriate heat temperatures kill the bacteria. Poultry and beef, especially hamburgers, should be cooked so no pink or blood can be seen. Produce must be washed before eating it and raw milk (unpasteurized) and raw eggs in foods should not be used unless the food is thoroughly cooked. Foods which contain raw uncooked eggs include many salad dressings like mayonnaise, as well as raw cookie dough; when your child or you think about licking the spoon or bowl after making cookies or cakes, think about whether raw eggs are in the batter.

Notes:

SARS- Severe Acute Respiratory Syndrome

Coronaviridae

Virus

Transmission: Respiratory droplet transmission through the air or on fomites

Vaccine: NO

Treatment: Supportive therapy for fever and labored breathing if necessary

Reportable: YES

Diagnostics: No rapid ID tests yet; ELISA, IFA and PCR tests are available

Key Facts:

 SARS (severe acute respiratory syndrome) first appeared in China in 2002. An intense worldwide effort to halt the spread of the new virus, which eventually became pandemic, was achieved in 2003. The virus was identified in 2003, by Koch’s postulates, to be SARS-associated coronavirus (SARS-CoV). SARS is an example of what can happen with emerging infectious diseases with the massive amount of international travel and commerce that occurs in the world today.

 The infection begins with the patient developing a fever that usually occurs 2 to 7 days after infection with the virus; flu-like symptoms usually follow. Eventually a dry cough occurs a few days after the fever begins and pneumonia may follow. The period of infectiousness to others is still being determined, so the CDC recommends SARS patients stay home for 10 days after the symptoms resolve. About 10-20% of SARS patients become progressively worse thought the infection and need to be hospitalized and put on mechanical respirators for their breathing difficulties; some cases of SARS have been fatal.

 SARS is spread from person to person through respiratory droplets when infected patients talk, cough or sneeze. People in close direct person-to-person contact with a person infected with SARS are at risk. In hospitals, these patients should be in negative pressure isolation rooms and proper disinfection protocols should be observed. In the home, use gloves and a surgical mask when in the same room as a SARS patient, wash your hands frequently with soap and water or use alcohol-based hand gels. Wash or dispose of all items contacted by the patient. Follow these protocols for the ten days following the patient’s recovery.

Notes:

Scabies

*Sarcoptes scabei*

Arthropod (Insect)

Transmission: Direct contact

Vaccine: NO

Treatment: Permethrin (Elimite), lindane, (Kwell), malathion (Ovide), ivermectin

Reportable: NO

Diagnostics: Visible burrows and rash, skin scrapings and biopsy (many patients have few mites and negative results should not rule out scabies)

Key Facts:

 The term scabies comes from the Latin word for itch, scabere, and intense itching is the hallmark of this skin infestation of mites. People with scabies get the 8 legged microscopic mites from direct, prolonged contact with other people who have scabies, although you can get scabies by using the towel, bedding and clothes of an infested person; simply shaking a person’s hand or hugging an infested person is usually not enough to transmit the mites. The mites cannot live off the human body for more than two to three days. Although animals also get sarcoptic mites, typically referred to as mange, you may become itchy from their mites, but their mites die within a couple of days on the human body; prolonged exposure to animals with mange of course means you may feel itchy until they are treated.

 After the mites some into contact with a patient’s skin, they burrow into the skin and symptoms of itching can begin from days to weeks after exposure. Thin burrows and very small pimple like rashes appear, often in the finger webs, and the skin folds of the joints, penis and breasts. Patients often lose sleep due to the relentless, intense itching, which is usually worse at night.

 There are various medicated lotions that can be prescribed by a physician to treat scabies; pregnant women and children usually get milder doses of medication. The lotions should be applied overnight from the neck to the toes, covering the body and then washed off 8 hours later; clip and clean under the fingernails of the patient to remove any mites or eggs. Antihistamines can be given to alleviate the itching. All clothing and bedding that the infested person came in contact with for the two days prior to treatment should be washed in hot water and dried in a hot dryer setting. Vacuum furniture and carpets and throw the vacuum bag away; no fumigation of the home is needed. The adult mites live for a month on the infested person but eggs laid during the burrowing of the mite hatch and therefore reapplication of the medicated lotion should occur 7 to 10 days after the first application. If multiple people in a household all need treatment, they should all be treated at the same time. In immune compromised patients and in the elderly, a scabies infestation can result in a condition called “Norwegian scabies” where hundreds to thousands of mites can occur on the patient and crusts form on the skin which becomes reddened. Antibiotics may be needed if the scratched skin becomes infected by bacteria.

Notes:

Smallpox

Poxviridae

Virus

Transmission: Respiratory droplets; skin crusts from pox lesions and contaminated bedding and clothes less common

Vaccine: YES (Dryvax® and others made with live vaccinia virus)

Treatment: Supportive

Reportable: YES

Diagnostics: Electron microscopy of blister fluids; PCR assay

Key Facts:

 Smallpox, also known as variola, is a disease known through history as a major killer, killing 300 million people during the 20th century alone, by some estimates. History has shown how smallpox was a major reason why many New World Indian tribe populations were decimated when the European settlers arrived. Through a worldwide vaccine program, the disease, which only occurs in humans and for which no carriers exist, has been eradicated from the human population in 1979. Only 2 labs, one in the U.S. and one in Russia contain stockpiles of the virus, apparently for research purposes. The virus is classified as a potential bioterrorist agent and the United States government has stockpiled enough vaccine to vaccine all Americans; the vaccine is not available to the general public at this time, but will be if the need occurs.

 Typically there is an incubation period for smallpox of between 1 and 3 weeks, after which the patient feels like they are coming down with the flu. Several days after these symptoms start, a rash of flat, red spots appears over your skin. The rash begins to blister with fluid that starts out clear and which eventually turns to pus. The rash begins on the face, hands and arms and then progresses to the chest and abdomen. The blistering lesions also occur on the palms, soles and inside the patient’s nose and mouth; lesions inside the eyelids can result in blindness. The blisters are painful and eventually scab over in a little over a week. When the scabs fall off they can leave disfiguring scars in the skin. People with smallpox are contagious only when the flu-like symptoms and when the rash and pox lesions appear, not during the incubation period; they are no longer contagious once the scabs fall off. About 30% of patients with one form of smallpox (variola major) die.

 The disease is most commonly spread by respiratory droplets with people in close contact with the patient, but the crusts and personal items such as clothing and bedding can also be infectious. Vaccination for smallpox is actually performed by breaking the skin with a two-pronged stainless steel needle and not with a typical hypodermic syringe and needle. The vaccine contains live vaccinia (cowpox) virus which allows immunity to the closely related smallpox virus to occur; one inoculation gives protection from the disease. If vaccinated, a pus filled blister will form in a week and then scab and fall off eventually 3 weeks after the vaccination. Since it is a live virus, the vaccine site should be kept dry and loosely bandaged to prevent the viruses from shedding. Waterproof bandages should be used when bathing and clothing that comes in contact with the site should be washed in hot water with bleach. All bandages and scab material should be put in a sealed plastic bag and discarded and always wash your hands with soap and water after contacting the skin of a smallpox patient. Do not apply ointments to the site of vaccination and do not pick at the site.

Notes:

Staphylococcus aureus infections

*Staphylococcus aureus*

Bacteria

Transmission: Contact, person to person most common but fomites and pets may transmit the bacteria.

Vaccine: YES (StaphVAX- protects against 2 strains but only lasts about 40 weeks, clinical trials continue)

Treatment: Antibiotics (resistant strains such as MRSA, VISA/VRSA)

Reportable: YES for VISA/VRSA (Vancomycin Intermediate/Resistant Staphylococcus aureus)

Diagnostics: Bacterial culture and sensitivity testing

Key Facts:

 Most people have had and have heard of staph infections, which are a shorthand way of saying these infections are caused by bacteria called *Staphylococcus*, most commonly *Staphylococcus aureus*. The term refers to the appearance of these bacteria under a microscope, where they look like grape-like clusters of bacteria (staphylo =grapes; cocci=spherical). Recently these bacteria have been in the news due to the increase in cases of antibiotic resistant strains of *Staph. aureus*, such as MRSA (methicillin resistant *Staph. aureus*) and now VISA/VRSA (Vancomycin Intermediate/Resistant *Staph. aureus*). These resistant strains use to be found only in hospitals and institutional medical care settings, but community associated MRSA infections (CA-MRSA) are becoming more common in the general population; there are fewer choices of antibiotics to treat these infections. *Staph aureus* bacteria are commonly found in many people as a part of their normal flora, on their skin and in their mouths and noses, and cause no problems; an estimated 1% of people normally carry MRSA and they are termed “colonized.”

 Most staph infections are not serious and typically affect the skin. They can cause folliculitis, boils, impetigo, cellulitis and sties; treatment with antiseptics and antibiotic ointments covered by clean bandages usually works to eliminate these infections, as do warm compresses. Wounds and surgical incisions can become infected, with the skin becoming red, warm, swollen and painful, sometimes with fever and often with pus, some appear as spider bites; a doctor should be contacted for these cases. In rare cases, staph infections can spread through the blood to other parts of the body causing pneumonia, heart valve problems, bone and joint infections and meningitis; these conditions occur most commonly in the young, old and in those with weakened immune systems. In babies and children usually under 5, staph infection can lead to staphylococcal scalded skin syndrome (SSSS), where it appears the baby’s skin is sunburned and peeling off. Some staph infections can lead to toxic shock syndrome (TSS).

 *Staphylococcus aureus* can also cause food poisoning intoxication when food is prepared with unwashed hands. The onset of symptoms is very quick, typically from 30 minutes to a few hours, with nausea, vomiting, diarrhea and abdominal cramps; the problem is usually brief, resolving in 1 or 2 days, and is commonly referred to by many as one of the causes of the “24 hour flu.” The bacterium is resistant to heat, drying and hypertonic conditions. *Staphylococcus* food poisoning is not contagious.

 Basic hand washing and proper disinfection of fomites, sterilization and hospital cleanliness can do much to reduce the number of cases of staph infections in hospitals. Hand washing with soap and water and alcohol based gels work well against MRSA, which is usually spread by people’s hands. MRSA and VRSA infections appear to be on the rise both in and out of hospitals and recent findings show they may account for many deaths each year in the United States. Hospital personnel and patients either infected or colonized with MRSA should have appropriate infection control standards observed. Always wash your hands or use an alcohol based hand gel before and after seeing each patient.

Notes:

Streptococcus A infections (Group A Strep)

*Streptococcus pyogenes*

Bacteria

Transmission: Direct person to person contact, respiratory droplets

Vaccine: NO

Treatment: Antibiotics

Reportable: YES (as invasive group A strep- necrotizing fasciitis and streptococcal toxic shock syndrome)

Diagnostics: Rapid strep test, negative results followed by bacterial culture and sensitivity testing

Key Facts:

 Many people have heard of strep throat, but few know that “strep” is a shortened form of the bacterial name *Streptococcus*, which refers to the chains of round bacteria seen under the microscope (strep = chains, coccus = spherical). Many people carry group A strep in their throats and on their skin with no problems ever associated with the bacteria. The bacteria can cause pharyngitis (strep throat), impetigo (a mild skin infection with oozing, draining lesions), scarlet fever (sore throat and a “strawberry red” tongue accompanied by a red sandpaper-like rash over the neck, chest and inner thighs), rheumatic fever (an allergic response of the body after a strep infection that can damage the heart valves), puerperal fever (uterine infection of the mother after delivery), pneumonia and wound infections. More seriously, some invasive group A strep strains can invade the tissues of the body and cause death due to “flesh eating disease” (necrotizing fasciitis) or streptococcal toxic shock syndrome. The bacteria causing these strep infections are often referred to as beta hemolytic group A strep. The bacteria can spread from wounds or from the nasal and throat secretions of infected people and carriers when the bacteria contact the eyes, nose, mouth or open wounds of another person.

 Typically, strep infections cause signs and symptoms that appear rapidly, within 1 to 3 days. Many strep infections are accompanied by a fever and swelling with pus at the site of infection. Most sore throats are caused by viruses, but up to 30% in children are caused by group A strep. Since strep throat can be contagious and can occasionally cause complications such as rheumatic fever, which can damage the heart, and glomerulonephritis, which can affect the kidneys, a rapid strep test, performed by swabbing the throat and tonsils, can help get a diagnosis in the doctor’s office in 5 to 10 minutes. Most of the infections caused by strep infections can be successfully treated with antibiotics; necrotizing fasciitis and toxic shock syndrome, if not treated in time can be fatal.

 To decrease the chances of getting a group A strep infection, people should wash their hands, especially after coughing or sneezing, but also when cooking and before eating. If you have a sore throat that is accompanied by a fever, you need to see a doctor; patients with strep throat should be kept home for 24 hours after beginning their antibiotics.

Notes:

Streptococcus B Infection (Group B Strep)

*Streptococcus agalactiae*

Bacteria

Transmission: Maternal-fetal, this is a part of many people’s normal bacterial flora of the intestines and genitourinary tract.

Vaccine: NO

Treatment: Antibiotics

Reportable: NO

Diagnostics: In pregnant woman, lab culture from vaginal and rectal swabs is recommended between 35th and 37th week of pregnancy; in others cultures from blood and cerebrospinal fluid .

Key Facts:

 Group B Streptococcus is a normal part of many people’s intestinal and urogenital flora. Although the bacterium is typed under the Lancefield system with other beta hemolytic streptococci, this is not the same beta-hemolytic bacterium that causes strep throat, which is Group A Streptococcus. In most people, group B strep causes no problems; people who have group B strep bacteria are termed “colonized.” Less than 50% of pregnant females are colonized, but for those who are, the bacterium can be passed to their children during delivery and can cause life threatening blood infections and meningitis. The bacterium can also cause urinary tract infections in women, as well as serious and potentially fatal blood infections and pneumonia in immune-compromised, diabetic and chronic disease patients.

 The CDC recommends that all pregnant women have a screening test for group B strep done between the 35th and 37th week of pregnancy; earlier testing is not advised. If a pregnant woman has already had a baby with group B strep, if she has a group B strep urinary tract infection, becomes colonized late in pregnancy, has a fever during labor, has rupture of the fetal membranes 18 hours or more before delivery or delivers pre-term, she is at high risk of giving her newborn baby group B strep. Those women testing positive for group B strep between the 35th and 37th weeks of pregnancy and women in the high risk group, who have not been tested, are advised to have intravenous antibiotics given during labor to reduce the chances of transmission of the infection to the newborn baby; the use of antibiotics before this is not effective. Almost all babies born to mothers with group B strep suffer no ill effects, but some babies can suffer from two types of group B infection: early onset and late onset. Early onset group B strep, which starts within 6 hours to one week of birth, is typically acquired from the mother during delivery and results in sepsis, meningitis and pneumonia. Late onset group B strep is less common and is acquired more than 1 week after delivery; it is often from carriers other than the mother, including hospital workers, and can also cause meningitis. Although both forms of group B streptococcus infection can be treated with antibiotics, babies with early onset group B have a higher fatality rate, which is less than 15%. Breastfeeding can continue for mothers who test positive for group B strep.

Notes:

Streptococcus pneumonia

*Streptococcus pneumoniae*

Bacteria

Transmission: Respiratory droplets

Vaccine: YES (PCV (e.g. Prevnar, Prevnar 13, Synflorix) – pneumococcal conjugate vaccine for children under 2 years; PPV (e.g. Pneumovax) – pneumococcal polysaccharide vaccine for adults and children over 2 years)

Treatment: Antibiotics

Reportable: YES (drug resistant invasive disease; invasive disease non-drug resistant in children less than 5 years of age)

Diagnostics: Bacterial culture on blood agar with positive optochin test

Key Facts:

 *Streptococcus pneumoniae* (pneumococcus) is an alpha hemolytic species of strep bacteria, unlike beta hemolytic group A and group B strep, which is another of the many normal bacterial inhabitants in the upper respiratory tracts of many people, especially children. The bacteria can cause pneumonia that can be fatal in infants, in the elderly and in people with chronic disease that weakens the immune system. The same bacteria can cause many cases of otitis media in children, meningitis, sinusitis, as well as blood, bone and joint infections; *Streptococcus pneumonia* is the most common cause of otitis media, pneumonia, meningitis and blood infection in young children.

 The incubation period for pneumococcal pneumonia is typically from 1 to 3 days. As a cause of pneumonia, *Streptococcus pneumoniae*, patients have a fever with shaking chills and produce rust-colored sputum. In approximately 25% of these cases the infection spreads to the blood; these forms of invasive *Streptococcus pneumoniae* infections that cause meningitis and blood infections are reportable. To diagnose meningitis, a spinal tap is performed and the spinal fluid is cultured; a blood sample can be cultured to determine if the infection has spread to the blood stream.

 There are 2 types of vaccines available to prevent pneumococcal infections. The PCV protects infants and is given 4 times in infancy. Another vaccine, the PPV protects children over 2 years of age and adults (especially those with chronic diseases, those without a spleen, Native Americans, cigarette smokers and alcoholics) and is typically given once. One nice side effect of the vaccine is that it has reduced the number of cases of otitis media in children. In the elderly, pneumococcus is a common secondary infection that follows the flu and results in the deaths of many seniors every year. All children and all adults over 65 years old should be vaccinated.

 To prevent the spread of *Streptococcus pneumoniae,* good hand washing practices are recommended. The bacteria are very sensitive to drying and disinfectants. When pneumococcus causes meningitis, prophylactic antibiotics are not necessary for those people in close contact with the patient.

Notes:

Syphilis

*Treponema pallidum*

Bacteria

Transmission: Sexually transmitted

Vaccine: NO

Treatment: Antibiotics

Reportable: YES (all stages, neurosyphilis, stillbirths and congenital syphilis are reportable)

Diagnostics: VDRL (Venereal disease research laboratory) test on blood or spinal fluid; RPR (Rapid plasma reagin) test on blood; EIA (Enzyme immunoassay) test on blood

Key Facts:

 Syphilis is a disease caused by a spirochete bacterial infection. It has been the cause of death of many historical figures, including Al Capone, Scott Joplin and the painters, Edouard Manet and Henri de Toulouse-Lautrec and it has infected many others. The disease is only transmitted from one person to another through intimate contact, such as vaginal, anal or oral intercourse; animals do not get nor do they carry syphilis. You cannot get syphilis from toilet seats, clothing, door knobs, utensils, hot tubs or pools.

 The disease has various stages that the patient progresses through if not treated with antibiotics. In primary syphilis, a painless, firm ulcerative lesion appears on the skin, at the site where the bacterium entered the body, 10-90 days after infection. The infectious lesion called a “chancre” sore goes away within 4-6 weeks. Secondary syphilis occurs several months after the initial infection and can occur as the chancres heal or after they have disappeared. A generalized non-itchy body rash can occur, during secondary syphilis, which can even affect the palms and soles of the feet; these symptoms last between 2 to 4 weeks. Muscle aches, fatigue, weight loss, fever, headaches, hair loss and swollen lymph nodes may also occur. It is during secondary syphilis that people are most infectious to others. Some people don’t have classic symptoms during the primary or secondary stages and many cases can go undetected if the lesions are inside the vagina, rectum or oral cavity. People with primary or secondary syphilis are most easily treated with antibiotics. Patients under antibiotic therapy are advised not to have sexual relations until all signs of syphilis have healed. Pregnant females can pass the infection to their unborn children and during primary and secondary syphilis these babies are often stillborn.

 If left untreated, the rash of secondary syphilis will go away but the infection doesn’t and the patient enters a silent phase called latent syphilis. Latent syphilis can last for many decades but often lasts from 1 to 10 years. During the latent stage, pregnant females can pass the infection to their unborn children who can develop congenital syphilis as newborns and die if the infection is left untreated. Antibiotics can be used to treat patients in the latent stage; the length of time that the latent stage has progressed determines how many weekly antibiotic injections the patient will need.

 The final stage of syphilis, tertiary syphilis, causes an immune response by the body that produces small tumor like “gummas” which can damage any part of the body in which they develop. The brain, eyes, heart, joints and bones can all be affected and death can result. Treatment with antibiotics is more difficult during the tertiary stage but the damage done to organs is permanent. People, who do get cured, at any stage of syphilis, can be reinfected, so wearing a condom can help stop the spread of the infection if the sores are covered; syphilis sores are an excellent portal for HIV.

Notes:

Tapeworms

*Taenia saginata* (beef), *Taenia solium* (pork), *Diphyllobothrium latum* (fish), *Hymenolepis nana* (human dwarf tapeworm), *Hymenolepis diminuta* (rodents)

Flatworms

Transmission: Fecal-oral

Vaccine: NO

Treatment: Niclosamide, Praziquantel

Reportable: NO

Diagnostics: Visible tapeworm segments in stool, identification of eggs in stool samples, ultrasound

Key Facts:

 Tapeworm infestations in humans are primarily a benign invasion of parasites that inhabit the intestines due to eating undercooked beef, pork or fish. Tapeworms are more common in underdeveloped areas of the world where proper handling of human feces is not observed, where human feces is used to fertilize pastures, where fecal contamination of drinking water occurs or where people eat raw or undercooked freshwater fish.

 With the human beef and pork tapeworms, typically the animals eat in pastures contaminated by human sewage, the animals eat the tapeworm eggs that passed out of humans in feces and the tapeworm larvae develop in the muscles of the animals. People who eat undercooked beef or pork then ingest the larvae which develop to become adult tapeworms in the human intestine. In some people, tapeworm infestations have been reported to last over ten years. The pork tapeworm has been known to also cause a condition known as cystocercosis, which is a serious problem that develops when a person ingests the pork tapeworm eggs directly from an infested person. Eggs ingested directly can develop into larvae that can migrate anywhere in the body.

 Infestation with the human fish tapeworm usually occurs when human feces or raw sewage contaminates fresh water areas. The larvae from human feces must enter a crustacean that is then eaten by the fish consumed by the patient. With the beef, pork and fish tapeworms, proper cooking or freezing the meat will kill the tapeworm larva and prevent infestation.

 In most cases, tapeworms do not cause any noticeable signs or symptoms; in some cases though abdominal discomfort and diarrhea have been noted. Treatment of intestinal worms is a simple procedure using oral medications; treatment of tapeworms in other organs poses a more serious problem.

 Other smaller tapeworms that affect people include the human dwarf tapeworm, which is acquired when humans directly ingest eggs of this tapeworm from infested people and the rodent tapeworm, which is acquired by eating insects, which contain the larvae, which are found in cereals and flour. The dog tapeworm, *Echinococcus granulosus*, acquired from eggs passed in dog feces, can also cause hydatid cysts in various organs which can be dangerous; humans are dead end intermediate hosts for the dog tapeworm. In all cases, it is critical when cleaning the feces from a person or animal that has tapeworms to wash your hands when you are finished.

Notes:

Tetanus

*Clostridium tetani*

Bacteria

Transmission: Wound contamination

Vaccine: YES (DTaP or Tdap (diphtheria, tetanus, acellular Pertussis) in childhood; DT (for pediatrics if child cannot get the pertussis portion of the vaccine); Td vaccine (tetanus and diphtheria) every ten years as adults)

Treatment: Antibiotics; TIG- tetanus immunoglobulin, supportive therapy often in ICU

Reportable: YES

Diagnostics: Physical exam, signs and symptoms of muscle spasms, stiffness and pain

Key Facts:

 Tetanus is a bacterial infection also known as lockjaw. The spore forming bacteria produce a neurotoxin that causes the skeletal muscles of the body to continuously contract and spasm; the jaws can’t open and the breathing muscles don’t work. The bacteria responsible for tetanus are found all over the world, in soil and in the intestines of humans and animals. As an anaerobic organism, *Clostridium tetani* cause problems in humans when they enter through wounds due to punctures, insect bites, burns and injections. Tetanus also can affect mothers and babies when poor sanitation occurs during delivery and when the umbilical stump is improperly cared for. When wounds scab and scar over, providing an anaerobic environment, the spores of the *Clostridium tetani* germinate and release their toxin that often leads to death.

 Cases of tetanus have an incubation period of between 2 days to 2 months, but typically begin in about 8 to 10 days, when the wounded area starts to have muscles spasms that eventually spread throughout the body. Patients often also have headaches, fever, difficulty swallowing and are restless and irritable. Even with life support measures aimed at helping the breathing muscles, many patients with tetanus die.

 To prevent tetanus, vaccination is critical and begins with a series of vaccines in children when they are 2 months of age. A booster vaccine is recommended at least every ten years and if a wound occurs during the ten year interval between shots, the booster may be given early. For those people with a potentially infected wound who don’t remember when their last booster shot was given, these people can get an injection of tetanus immunoglobulin, a potent shot containing antibodies already made by another organism against the tetanus toxin for immediate protection. In these cases, a booster vaccine will also be given to allow the patient to develop their own antibodies in a few weeks.

 Any deep wound, crushing injury or skin infection that creates dead skin has the potential to cause tetanus if the bacteria enter through the skin. Rusty nails are commonly presumed to be a source of infection, but any nail, rusty of not, that causes a deep puncture can be a problem. Intravenous needles used by drug addicts as well as umbilical stumps coated by soil or dung in some cultures have been noted as common methods of infection. For any penetrating wound, clean the wound well with soap and water and seek medical help if you have not been vaccinated for tetanus or if your booster shots are not up to date.

Notes:

Toxic Shock Syndrome

*Staphylococcus aureus* (Toxic Shock Syndrome or TSS) and

*Streptococcus pyogenes* (Streptococcal toxic shock syndrome or STSS or Toxic Shock-like Syndrome (TSLS))

Bacteria

Transmission: Surgical incisions and wounds of the skin; tampons

Vaccine: NO

Treatment: Antibiotics; supportive care for signs of shock

Reportable: YES

Diagnostics: No specific tests are done to confirm Toxic shock syndrome; signs and symptoms and ruling out other diseases helps the diagnosis

Key Facts:

 Most people had never heard about toxic shock syndrome (TSS) until the early 1980’s when it was reported that some women using absorbent tampons were developing a shock-like syndrome. Since that time it has been found that children and men can get toxic shock syndrome also. It has also been found that *Streptococcus pyogenes*, the same bacteria that causes strep throat, can cause a similar syndrome called Streptococcal toxic shock syndrome (STSS), even though STSS rarely occurs with strep throat infections. *Staphylococcus aureus* and *Streptococcus pyogenes* in the upper respiratory tract, on the skin and in the vagina are most commonly the cause of TSS, yet only certain strains of these bacteria cause the illness and many people infected or colonized with these bacteria never get TSS or STSS. Women who use absorbent tampons, surgical cases with staph infections and nasal surgical patients appear most at risk for developing these syndromes.

 TSS typically begins with mild symptoms and then occurs 2 to 3 days after the infection starts; typically it is accompanied by a high fever, a rapid drop in blood pressure that can make the patient feel faint, diarrhea, vomiting, and head and muscle aches. Approximately 24 hours later, the patient will develop a sun burn like rash which covers the body and which will eventually peel; signs of shock will continue which can lead to death. In some patients, hair and nail loss can occur several months after the infection and the infection can reoccur, but usually in a more mild form.

 STSS usually occurs within a couple days of a strep infection and typically is accompanied by a fever and a rapid decrease in blood pressure. There can be a blotchy rash that may peel with STSS. Commonly STSS occurs when there is a wound infection that has not been cleaned and where dead flesh is not removed from the wound.

 Signs of shock include cold extremities, a fast but weak pulse, shallow and quick breathing, skin that is pale and moist, confusion and anxiety; go to the emergency room immediately if someone has these signs and symptoms. Shock can kill very quickly so it is important to get treatment as soon as possible for either disease; in the hospital supportive care for shock can be provided.

 Both types of bacteria commonly come from unwashed hands, so hand washing is an important factor in these diseases. Removal of the source of infection and antibiotics are commonly used to treat patients with TSS and STSS; removal may include debridement and surgical removal of deep infected tissues or simply removing nasal packing material or tampons and keeping wounds clean.

Notes:

Toxoplasmosis

*Toxoplasma gondii*

Protozoan

Transmission: Ingestion of cysts

Vaccine: NO

Treatment: Spiramycin (for pregnant mothers); Clindamycin (HIV/AIDs patients); atovaquone (HIV/AIDS); pyrimethamine/sulfadiazine

Reportable: NO

Diagnostics: Rapid serologic IgG/IgM Toxoplasmosis test

Key Facts:

 Toxoplasmosis is a protozoan infection that typically occurs when people ingest undercooked meats, such as lamb, pork or venison, or when they are in contact with cat feces, directly or indirectly, through fomites or contaminated water. Most people who are infected with toxoplasmosis show no signs or symptoms, some may have mild flu like symptoms a week to two weeks following infection which may last about a month, but immune-compromised patients may suffer from serious health consequences and the infection can be passed from mother to unborn child in-utero, and this may also cause serious problems for the child.

 Toxoplasmosis, in immune-compromised patients can affect the brain, eyes and other organs, leading to blindness and sometimes death. For women who become pregnant, new infections immediately before or during the first trimester of pregnancy can lead to mental retardation, eye damage, hearing loss and other problems in their newborn children. It is helpful for pregnant women to be tested for toxoplasmosis before pregnancy. A high IgM antibody titer indicates a newly acquired infection and the need for treatment by a doctor, a high IgG antibody titer indicates a prior infection and there will be no need to worry about the newborns health due to this disease. In many cases, no matter when the infection is acquired, toxoplasmosis can become a latent infection with cysts harbored in your muscles or nervous tissues. Later, if your immune system is compromised, these latent cysts can reemerge and lead to signs and symptoms of the disease.

 Prevention includes avoiding cat feces, especially for pregnant women; pregnant women should avoid changing the cat litter, and they should wear gloves when they garden or if they have to change the kitty litter. In all cases, people should wash their hands with soap and water after any outdoor activity; they should avoid eating undercooked meat and should wash their hands after handling raw meat. There are treatments for both acute and latent infections of toxoplasmosis, especially for early pregnancy and immune-compromised patients. If you have a cat, there is no need to get rid of your cat, since they only shed the cysts for approximately two weeks after they are infected and they will get rid of the infection on their own. Do not let your cat go outside and do not accept stray cats into your home and do not feed cats raw meat if you want to avoid having your cat get the infection.

Notes:

Traveler’s Diarrhea

*Escherichia coli* is the most common cause but several other bacteria, protozoa and viruses also can cause this type of infection.

Bacteria

Transmission: Fecal-oral

Vaccine: NO

Treatment: Bismuth subsalicylate (Pepto-Bismol) for traveler’s diarrhea

Reportable: NO

Diagnostics: Bacterial culture

Key Facts:

*E. coli* is one of the many bacterial species that is a part of your normal intestinal flora. There are hundreds of strains of the bacteria found around the world; most strains cause no problem when accidentally ingested, but there are several harmless strains that are associated with traveler’s diarrhea and one strain, O157:H7, which is a major food borne pathogen that in some cases can lead to deaths. In both cases, the diseases are due to fecal material contaminating food or water. *E. coli* also is a common cause of urinary tract infections and when the bowel perforates, it can lead to peritonitis and become fatal.

 Traveler’s diarrhea is most common when travelers from industrialized countries visit countries in Central and South America, Africa and Asia, with fewer cases arising when tourists visit southern Europe, Russia and Israel. The most common cause of traveler’s diarrhea is due to enterotoxigenic strains of *E. coli* (ETEC) that produce toxins that affect the intestines, resulting in loose or watery bowel movements, cramping, bloating, nausea and vomiting; some cases of traveler’s diarrhea are due to viruses and protozoa. Traveler’s diarrhea is due to human fecal contamination of food or water or from people who don’t wash their hands after defecating; avoiding raw or undercooked meat and seafood, fruits and vegetables, tap water, ice and unpasteurized dairy products is the best way to avoid getting traveler’s diarrhea. Avoid all foods sold by street vendors. The disease typically resolves on its own in 2-3 days and the only treatment recommended is supportive therapy to replace lost fluids; Pepto-Bismol is often useful as well. If the diarrhea lasts for over 3 days or becomes bloody, a doctor should be consulted; antibiotics and anti-motility medications should only be given under a doctor’s care.

Notes:

Trichinellosis (Trichinosis)

*Trichinella spiralis* and other species

Nematode (roundworm)

Transmission: Food-borne

Vaccine: NO

Treatment: Mebendazole for adult worms in intestines; for encysted larvae there is no cure, supportive therapy and corticosteroids can help

Reportable: YES

Diagnostics: Trichinella ELISA test; muscle biopsy

Key Facts:

 There once was a time in the United States when eating pork could have been a source of a worm infestation, called trichinella or trichinellosis, which caused pain when the worm’s larvae made cysts in people’s muscles. Due to laws about the kinds of foods that can be fed to pigs, this zoonotic infection is uncommon today in the United States, but it still occurs around the world. The source of infestation is when people eat raw or undercooked meats, not only from domestic pigs but also from wild boar, bears, seals and walrus. The infestation can occur in many other animals including rats, dogs and horses.

 When people eat undercooked pork, or any meat, that contains the encysted larvae of the trichinella (trichina) worms, the cysts are dissolved by stomach acid and the parasites enter the large intestines, causing nausea, vomiting, fever and diarrhea approximately 1 to 2 days later. After mating the adult worms die but their offspring enter the lymphatic system and travel through the circulatory system to all parts of the body. In the muscles of the body, the larvae curl up and surround themselves in a capsule, called a cyst. When another animal eats a cyst in muscle they can get infected. The larvae migrating through the body can cause symptoms, if the number of worms eaten is high enough, in about 2 to 8 weeks after eating the infested meat; the symptoms include headache, fever, muscle and joint pain, cough, itchy skin, and swelling around the eyes.

 If raw or undercooked pork or wild carnivorous animal meat is eaten, there are medications to treat the adult worms in a patient’s intestines. The cysts embedded in muscles are not treatable; pain killers and steroids can alleviate the symptoms for these patients. In rare cases the larvae can encyst in the heart or brain and cause death. To prevent the possibility of acquiring trichinellosis, all meat should be properly and thoroughly cooked to at least 170°F. Freezing pork at -15°C for 3 weeks also can kill the larvae; in wild carnivore meat, freezing is not a reliable way of killing the larvae and these meats should always be cooked thoroughly. Other food preservation techniques are not reliable ways of eliminating the larval cysts in meat.

Notes:

Trichomoniasis

*Trichomonas vaginalis*

Protozoan

Transmission: Sexually transmitted

Vaccine: NO

Treatment: Metronidazole; Clotrimazole (if pregnant)

Reportable: NO

Diagnostics: Microscopic examination of vaginal or urethral swab sample or Pap smear

Key Facts:

 Trichomoniasis, also known as “trich” is one of the most common sexually transmitted diseases in the world. *Trichomonas vaginalis* are flagellated protozoa which can’t be seen without a microscope and cause unpleasant signs and symptoms, particularly in females. Fortunately, trichomoniasis isn’t a serious disease, and in many people it is asymptomatic, but it can cause premature deliveries in infected women and it can cause inflammation of the reproductive and urinary tract organs. An infection with trichomoniasis often leads to diagnostic testing for other sexually transmitted disease like HIV, syphilis, gonorrhea and chlamydia.

 In women, the protozoa cause vaginal itching and a smelly, foamy yellow or gray green vaginal discharge; sometimes painful urination occurs. In males it less frequently causes any signs or symptoms but it can cause painful urination and a urethral discharge; swollen, painful testicles can indicate the protozoa have caused en epididymitis. The protozoa can also infect the prostate.

 The treatment of the infection needs to include both sexual partners at the same time, as men are often asymptomatic carriers who can re-infect their partners. Douching is not advisable as a way to treat the infection. Latex condoms are helpful in preventing the spread of the infection but the protozoa can survive for a half hour in moist places outside the body, so swimsuits and towels shouldn’t be shared, to prevent these rare possible methods of transmission of the infection.

Notes:

Tuberculosis

*Mycobacterium tuberculosis* (and in rare cases from *Mycobacterium bovis* in unpasteurized milk)

Bacteria

Transmission: Respiratory droplets

Vaccine: YES (Bacillus of Calmette-Guerin or BCG vaccine)

Treatment: Antibiotics: Isoniazid (INH),rifampin, ethambutol, pyrazinamide and others

Reportable: YES

Diagnostics: Chest X-rays, PPD skin test, sputum smear (acid fast +) and culture, TB blood tests (interferon-gamma released assays)

Key Facts:

 Tuberculosis (TB), also known historically as consumption and the white plague; it is currently the leading bacterial cause of death in the world. During the 1800’s some scientists believe that 25% of Americans died of TB, but after the advent of antibiotic therapy, TB was on the decline in the U.S. until the 1960’s; since the 1990’s TB in the U.S. is once again in decline, but globally, TB is on the rise.

 Having an infection caused by TB and having the disease tuberculosis does not mean the same thing; it is estimated that 2 billion people around the world are infected with the TB bacterium. The infection is spread by breathing in respiratory droplets from contagious patients. To get infected with the bacterium, typically you need to be in close proximity to an infectious TB patient for a prolonged period of time. Poor nutrition, immune weakening conditions, IV drug use and alcoholism also play a part in increasing a person’s risk of infection. Less than 25% of people around a contagious TB patient usually become infected and for those who do, the latent form of the infection occurs in 90% of these cases, and they never progress to the active form of the disease. Some people come down with active TB disease immediately or, more commonly, many years after their infection occurred due to a change in their immune system status. People infected with TB are positive for the TB skin test, have normal chest X-rays, have negative sputum smears and cultures, have no signs or symptoms and are not infectious to others. People with active cases of the disease have a positive skin test, abnormal chest X-ray lesions, acid fast sputum smears and positive *Mycobacterium tuberculosis* cultures are infectious if not treated and show typical symptoms of disease. Tuberculosis patients suffer weight loss, fatigue, they cough up blood and wheeze, and they have fevers, night sweats, and can have chest pain and difficulty breathing. The tuberculosis bacilli invade the alveolar macrophages of the lungs and can spread to other parts of the body through the lymphatic system; the bacteria when they enter the circulatory system can cause what is called “military” or disseminated TB which can affect the bones, joints, nervous system, and genitourinary system.

 Testing for TB in the U.S. commonly involves a skin test (Mantoux, PPD – purified protein derivative) which is read 48-72 hours after the intracutaneous injection; a positive test appears as a 10mm or greater red, raised, and hard lesion at the site of injection. A positive test doesn’t mean the person has the disease, but they may have been infected or may have had the BCG vaccine that is typically given in many other countries of the world. In the U.S, the BCG vaccine is not typically given since it causes false positive results with the TB skin test and since it doesn’t prevent infection in most adults. The skin test also doesn’t distinguish between infection and disease; chest x-rays and sputum samples need to be taken to determine the stage of the infection. Treatment of people infected and those with the disease includes the use of antibiotics; usually for many months. People infected usually receive one or two of the common TB antibiotics for over 6 months to prevent the latent infection from becoming an active case in the future. People with the active disease receive combinations of antibiotics for sometimes up to 2 years. The patient is not considered to be contagious to others after being on antibiotics for a couple of weeks, unless they have a resistant strain; chest x-rays can help in these cases. The antibiotics must be taken on time; multi-drug resistant strains (MDR-TB) are becoming more common and there are now even extensively resistant strains (XDR-TB) which are becoming very difficult to treat. There are new serologic tests being developed to more rapidly diagnose TB and there are several promising vaccines being studied.

Notes:

Tularemia

*Francisella tularensis*

Bacteria

Transmission: Respiratory, Insect bites, direct contact with infected animals, food or water

Vaccine: NO (one is under review by the FDA)

Treatment: Antibiotics

Reportable: YES

Diagnostics: Antibody titer test; blood or sputum culture

Key Facts:

 Tularemia is named after the county in California where it was first recognized, and also is called rabbit fever or deerfly fever, as well as other regional names. The bacterial infection requires very few bacteria to cause infection and is a Biosafety Level 3 organism, considered a potential bioterrorist agent. The disease can be acquired by being bitten by several kinds of insects, especially deerflies, ticks and mosquitoes; drinking infected food or water can also be a source of infection. Hunters and trappers, as well as veterinarians and wildlife management personnel, who work with animals and their carcasses, should be careful to avoid allowing cuts coming in contact with animal secretions and may want to wear masks to avoid breathing the bacteria from animal hides. Gardeners can be infected with the most deadly form of rabbit fever, the pneumonia type, when they inhale the bacteria from soils, lawns and gardens. Tularemia is not contagious from other people.

 The onset of tularemia occurs from 3 to 5 days after exposure to the bacteria, but can take longer. Patients can suffer from fever, headaches, diarrhea, fatigue, muscle and joint pain, a sore throat and a dry cough. Sores on the skin or in the mouth may develop and the eyes may swell. Depending on how the infection was acquired, the lymph nodes may become swollen; patients who inhale the bacteria develop pneumonia and produce bloody sputum. If untreated with antibiotics, tularemia can be a fatal disease.

 People typically get tularemia from insects, but animal reservoirs exist too. Rabbits, rodents and hares are commonly implicated in the spread of the infection, but many wild animals and pets can get infected as well. The bacteria are endemic to many areas of North America, Europe and Asia. To avoid exposure to the bacteria, wear rubber gloves whenever skinning an animal, be sure to thoroughly cook any wild game before eating, use insect repellants, and refrain from any contact with water from areas where the disease is known to occur.

Notes:

Typhoid Fever

*Salmonella enterica* subspecies *enterica* serovar Typhi

Bacteria

Transmission: Fecal-oral

Vaccine: YES (Vivotif Berma, Typhim Vi)

Treatment: Antibiotics

Reportable: YES

Diagnostics: Fecal culture

Key Facts:

 Typhoid fever has historically been a killer of many people, famous and not, such as Abigail Adams, Stephen A. Douglas, and Abraham Lincoln’s son, Willie, but the most famous case concerning typhoid fever is that of “typhoid Mary” Mallon. Mary didn’t die from the disease but she epitomizes how the disease spreads through unsanitary practices used in food handling. Typhoid fever rarely occurs in the United States anymore because of the proper sanitation of food and water supplies and the knowledge of the benefits of hand washing, but the disease still affects millions of people around the world.

 Typhoid fever only affects humans and is spread through fecal contamination of water and food. Many people, like “typhoid Mary” carry and shed the bacteria in their feces long after their disease is over. The bacteria leave the intestines and enter the bloodstream where they affect many parts of the body, particularly the liver. People with typhoid fever develop a high fever, with stomach aches, abdominal tenderness, constipation followed by diarrhea, bloody stools, weakness and headaches; in some patients classic rose-colored spots appear on the chest and abdomen. Treatment consists of antibiotics and sometimes supportive intravenous fluids; the patient feels better in a couple of days and within 2 to 4 weeks the infection usually is over. Most recovered patients have permanent immunity. In almost 20% of cases that do not get treatment, death can occur due to intestinal bleeding and perforation or kidney failure.

 When traveling overseas, check to see whether typhoid fever is endemic to that part of the world and if it is, get vaccinated for typhoid fever so that the vaccines are completed at least one week before you leave on your trip. Since the vaccine is neither 100% effective nor permanent, it is also important to be careful what kind of food and beverages you consume. Avoid ice cubes in drinks, only drink bottled or boiled water, eat fruits and vegetables that have to be peeled, eat foods that are heated well and are served steaming, and avoid food bought from street side vendors.

 If you get typhoid fever, and you work in food service or a childcare job, you may not be allowed to go back to work until your stool samples are negative for the *Salmonella* bacteria. In any case, stool samples need to be taken and cultured until the infection is eliminated. As with other diseases caused by intestinal microbes, it is important to wash your hands often, especially after using the restroom, to use potable water and to cook food thoroughly.

Notes:

Typhus

*Rickettsia prowazekii* (epidemic typhus)

Bacteria

Transmission: Human body lice (*Pediculus humanis corporis*)

Vaccine: YES, but production has been discontinued

Treatment: Antibiotics (Doxycycline, Tetracycline)

Reportable: NO

Diagnostics: Detection of typhus specific antibodies in patient serum

Key Facts:

Even before the middle ages, epidemic typhus (also known as “jail fever” and “camp fever”) has been a disease most feared in times of war and where famine and poverty exist. Spread by human body lice (not the human head louse), the bacteria exist in the intestines of the louse. When lice bite humans, the bite wound itches and the bacteria in the feces, left by the louse, get rubbed into the skin. The disease has been the cause of death for millions of soldiers for centuries, sometimes being the deciding factor in the outcome of war. It also has been the cause of thousands of deaths in concentration camps (Anne Frank died of typhus) and has been the cause of death in epidemics during times of famine and poverty. In places where people live in close quarters and where hygiene is more difficult, epidemic typhus has been the cause of deadly “plagues” through history. The disease does exist today and appears most commonly in regions of South America, Asia and Africa.

After an incubation period that lasts about 2 weeks, patients suffering from epidemic typhus have severe headaches, coughing, sensitivity to light, decreases in blood pressure, myalgia, arthralgia, with prolonged fevers and chills. A rash, appearing about 5 days after the fever appears, begins on the chest and spreads over much of the rest of the body as the patient can suffer kidney damage and becomes delirious, stuporous and eventually comatose. Eventually, up to 60% of patients can die if left untreated. Antibiotics are effective in treating the disease. At this time, no vaccine for human use is being manufactured. Prevention is best achieved by good sanitation. To eliminate body lice, patients should bathe daily, use insecticides (10% DDT, 1% Malathion) and boil their clothes or not use their clothes for 5 straight days. Human body lice die when they cannot feed on human blood, but the bacteria responsible for this disease can remain alive for days in dried lice feces and in dead lice.

There is a relapsing, latent form of epidemic typhus called Brill-Zinsser disease. Signs and symptoms are less severe than the initial bout of the infection. Other types of typhus do exist; one type called sylvatic typhus is spread by fleas on flying squirrels and is mild compared to epidemic typhus. Another type, called murine typhus, which is caused by the bacterium *Rickettsia typhi*, is also less serious and is spread by the fleas of rats. There is no relationship between typhus and typhoid fever!

Notes:

Vaginosis

*Gardnerella vaginalis* and other bacteria also implicated

Bacteria

Transmission: Normal bacterial flora

Vaccine: NO

Treatment: Metronidazole

Reportable: NO

Diagnostics: Vaginal swab to look for “clue cells” (epithelial cells covered by bacteria), vaginal pH test

Key Facts:

 Vaginosis is not actually an infection, and it is not sexually transmitted; it is due to an overgrown of certain common bacteria in the vaginal flora at the expense of the beneficial *Lactobacillus* species that are also a part of the vaginal flora. The excessive growth of these bacteria, such as *Gardnerella vaginalis,* appears to happen in women during their reproductive years, from 15 to 50 years of age, who have multiple or new sex partners, who douche or use intrauterine devices or other reusable, insertable birth control methods and feminine hygiene products.

 Many women who have an overgrowth of *Gardnerella* have no signs or symptoms, but some women do have a grayish-white or yellow vaginal discharge that has a fishy odor. Many women learn about the problem only when they have their annual gynecologic exam. The overgrowth of the bacteria causing vaginosis can be treated with several antibiotics, such as metronidazole (Flagyl); be sure not to drink anything containing alcohol when taking this drug as it can cause nausea and vomiting. It is important to treat vaginosis because it can lead to increased risk of pelvic inflammatory disease (PID) as well as endometritis in the mother, and premature delivery and low birth weight in newborns. To prevent getting vaginosis, condoms appear to be beneficial; perhaps because semen is slightly alkaline and can upset the vaginal environment enough to cause the bacterial imbalance that causes the problem.

Notes:

Variant Creutzfeldt-Jakob Disease (vCJD)

Prion (suspected)

Transmission: Believed to be food borne

Vaccine: NO

Treatment: NONE

Reportable: NO

Diagnostics: No diagnostic tests while living; confirmation post-mortem on brain tissue

Key Facts:

 Variant Creutzfeldt-Jakob disease is a newly described disease that causes a wasting of the nervous system. It leads inevitably to depression, psychosis and eventually loss of all neuromotor function and death. The disease has no known cure and is suspected to be transmitted when people eat beef from cows with Bovine Spongiform Encephalopathy (BSE), also known as Mad Cow disease. Diagnostic tests do not yet exist and confirmation of the diagnosis is made post-mortem on the brain of the patient. The disease mimics a very rare genetic disease called Creutzfeldt-Jakob disease (CJD) but vCJD appears to be caused by a prion or some virus-like particle and affects younger patients, typically around 30 years of age, as opposed to CJD where the patients are usually over 60 years old. There are other differences between the diseases but the link to eating cows is growing. The few cases that have occurred to date have been in Europe, usually Great Britain, but one case has appeared in Canada and one in the United States. CJD has a very long incubation period and so could vCJD, the number of cases in the future cannot be predicted but the beef cattle industry is monitoring and removing cows that test positive for BSE.

Notes:

Vibriosis

*Vibrio parahemolyticus, Vibrio vulnificus, Vibrio alginolyticus*

Bacteria

Transmission: Food and water, usually from shellfish

Vaccine: NO

Treatment: Antibiotics

Reportable: YES

Diagnostics: Special culture media used to culture feces, blood, and wounds

Key Facts:

 Do you like to eat raw oysters? If so you are most at risk of acquiring these infections that commonly occur when eating raw shellfish and finfish, or when coming in contact with contaminated water. Vibrio species commonly occur in salt water and they rapidly multiply in warm water. These microbes can also enter the body through cuts in the skin while handling shellfish or when swimming in salt water environments, like ocean beaches.

 *Vibrio parahemolyticus* typically causes symptoms to occur 24 hours after ingesting these bacteria and the watery diarrhea, abdominal cramps, vomiting and fever with chills usually resolves within 3 days on its own without treatment. In severe cases, when people with immunocompromised systems become infected, antibiotics may be administered and supportive therapy may be necessary.

 *Vibrio vulnificus* typically can be a more severe infection. As an intestinal infection, *Vibrio vulnificus* can cause abdominal cramping, diarrhea and vomiting. If the *Vibrio vulnificus* enter the bloodstream, they can cause a fatal infection, particularly if a person is immunocompromised. These infections, commonly in patients with chronic liver disease, are often fatal when they enter the bloodstream. Patients with a *Vibrio vulnificus* infection suffer from fever with chills, septic shock and blisters on the skin; rarely amputation is required. Antibiotics are needed immediately with a Vibrio vulnificus infection.

 To prevent vibriosis, either avoid eating raw shellfish and finfish, or cook it thoroughly. Refrigerate shellfish when you are not eating it. If you are immunocompromised or have chronic liver disease, never eat raw food from the sea.

Notes:

Walking Pneumonia

*Mycoplasma pneumoniae*

Bacteria

Transmission: Respiratory droplets

Vaccine: NO

Treatment: Antibiotics (erythromycin, clarithromycin (Biaxin), [azithromycin (Zithromax)](http://www.DrGreene.com/21_111.html), and tetracyclines)

Reportable: NO

Diagnostics: Bacterial culture, determination of cold agglutinin titers, serology, PCR testing

Key facts:

 As the name implies, patents with walking pneumonia generally are up and about, rarely needing bed rest or hospitalization. The disease is caused by a very slow growing bacterium; finding the cause of a person’s illness due to walking pneumonia (atypical pneumonia) can be difficult due to this, so treatment with antibiotics should begin, if the infection is suspected, when a doctor detects the lung sounds of pneumonia after listening to the chest with a stethoscope.

 People with walking pneumonia generally begin to have cold-like symptoms from 1 to 4 weeks after they are infected with the mycoplasma bacteria. The bacterium is inhaled on small respiratory droplets of infected people, but prolonged exposure to infected people is usually required. The infection causes most people to cough, have a fever, sore throat, runny nose and headaches. Patients are generally tired, with shortness of breath, and bronchitis as well as otitis media can also occur. Unlike people with a cold, people with walking pneumonia are generally sick for about one month and some have a dry cough for even longer.

 Walking pneumonia is most common in children and young adults and can be treated with antibiotics. Since mycoplasma bacteria have no cell walls, antibiotics that work against bacterial cell walls, such as penicillin, don’t work for these infections. Patients with walking pneumonia should get more rest than they usually do and only use cough suppressants when the coughing keeps them awake.

Notes:

Warts

Human papilloma viruses

Virus

Transmission: Contact

Vaccine: NO

Treatment: Liquid nitrogen, scraping, burning, laser therapy and surgical removal; chemical treatment includes podophyllin, salicylic acid and Imiquimod cream (Aldara)

Reportable: NO

Diagnostics: Clinical observation and biopsy.

Key Facts:

 Warts, also known as verrucae, occur on various parts of the skin and mucous membranes as benign growths. They are caused by over 100 different human papilloma viruses (HPV) and are transmitted through direct or indirect contact. Three of the more commonly referred to types of warts are common warts (verruca vulgaris- HPV 2 and 7) which occur commonly on the hands, flat warts (verruca plana- HPV 3, 10) which occur commonly on the face and extremities, and plantar warts (verruca plantaris- HPV 1,2, and 4) which occur usually on the soles of the feet. Genital warts are discussed in another section of this book.

 Warts occur most commonly in children and adolescents; person to person contact or contact with fomites can transmit the viruses responsible for these growths. One myth is that warts are transmitted when handling frogs and toads; this is untrue. The incubation period for the development of warts can be months and depends on many factors; warts are also contagious from one place on the body to another. Common warts occur usually on the fingers and hands and appear as thick small cauliflower like growths with tiny black pinpoint capillaries visible in the wart. Flat warts are smoother and flatter growths that usually appear on the face, arms and trunk. Plantar warts can be painful since they are thick growths that occur on the bottom of the feet.

 Treatment for warts depends on the location, size and number of warts as well as the patient’s preference. Most warts tend to resolve on their own often in from 6 months to 2 years, but warts can spread if left untreated. Other than chemical treatments, which can be obtained and applied at the dermatologist’s office or which can be bought over the counter, laser removal, curettage (scraping), surgery, liquid nitrogen cryosurgery (freezing) and burning the warts can be done in the doctor’s office after anesthetizing the wart.

Notes:

Whooping Cough

*Bordetella pertussis*

Bacteria

Transmission: Respiratory droplets

Vaccine: YES (DTaP, DPT, Tdap)

Treatment: Antibiotics

Reportable: YES

Diagnostics: Nose and throat bacterial culture

Key Facts:

 Whooping cough, or pertussis, is a highly communicable respiratory infection that used to be a common source of death in infants; thanks to vaccines and antibiotics, the disease is less commonly heard about in the Unites States. The name of the disease comes from when the patients “whoop,” after several hacking coughs, to try to breathe air into the lungs. The vaccine to prevent whooping cough is given beginning in infancy but doesn’t last very long and children and young adults have been seen in increasingly large numbers recently suffering from mild cases of whooping cough, which generally affects infants most severely.

 Children with whooping cough typically have cold-like symptoms anywhere from a few days to a couple of weeks after being infected. The cold like symptoms including runny nose, sneezing, low grade fever and a mild cough can last a couple of weeks and are followed by 2 to 4 weeks of a dry, hacking cough which cause the patient to make a whooping sound as they try to get air. Recovery can last for several months. Antibiotics help to shorten the length of the infection if given early in the course of the disease and they help to shorten the period of infectiousness. Other family members may need preventative antibiotics or vaccination if there is a case of whooping cough in the home. In infants, who have a greater risk of pneumonia, dehydration and seizures, the disease may be so severe that hospitalization is required. In the hospital, patients need to be isolated.

 Prevention against whooping cough involves giving the DTaP (diphtheria, tetanus, acellular pertussis) vaccine 5 times beginning, in early childhood, at 2 months of age. Since the vaccine doesn’t last a lifetime, adolescents, ages 11-18, are recommended to get vaccinated again, this time with the Tdap vaccine. Adults and adolescents, who generally simply have a persistent cough when infected with *Bordetella pertussis*, are often the reservoirs of infection for younger children and infants; it is in infants that the infection causes the most serious effects and therefore it is crucial to vaccine babies and adolescents at the proper intervals.

Notes:

Yellow Fever

Flaviviridae

Virus

Transmission: Mosquito

Vaccine: YES (17D-204 strain YF-VAX)

Treatment: Symptomatic and supportive treatment

Reportable: YES

Diagnostics: ELISA test for IgM antibodies; virus isolation

Key Facts:

 Yellow fever is a disease caused by an arbovirus that gets its name by causing jaundice in patients suffering from the disease. Several types of mosquitoes transmit the disease which today occurs only in Central and South America, the Caribbean nations and Africa. Dr. Walter Reed, the famed American army surgeon, after whom Walter Reed Army Hospital is named, made his claim to fame working on the transmission of yellow fever.

 Yellow fever has an incubation period of several days after the bite of a mosquito. Patients may have fever with chills, back and muscle aches, and vomiting. For most patients, these symptoms last a few days and a full recovery occurs. For between 10-20% of patients though a second phase of the infection occurs that results in the fever returning with liver failure and jaundice, renal failure and bleeding from the mouth, nose and eyes. Bleeding occurs in the stomach resulting in black stools and bloody vomit. Many people who develop these symptoms then die from kidney failure; some patients do recover from this stage, also.

 Through history, yellow fever epidemics were fairly common in Europe and the colonial United States. Mosquito control is a critical part of controlling this disease, but vaccination today should make this a rare disease; unfortunately, in underdeveloped tropical countries people still die from the disease. When travelling to countries with yellow fever, the vaccine is required to enter many of these countries. The vaccine lasts for 10 years, and booster shots need to be given when needed. The disease is maintained in populations of non-human primates, like chimpanzees, who also get infected by the yellow fever virus.

Notes:

Emerging Infectious Diseases (EID’s)

 What other infections are lurking in the world and are ready to mutate to become new infections of the future?

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