

GLOSSARY OF MICRO-ORGANISMS

CAMPYLOBACTER JEJUNI

Campylobacteriosis is an infectious disease caused by bacteria of the genus *Campylobacter*. *Campylobacter* is one of the most common bacterial causes of diarrheal illness in the United States.

The *Campylobacter* organism is actually a group of spiral-shaped bacteria that can cause disease in humans and animals. Most human illness is caused by one species, called *Campylobacter jejuni*, but 1% of human *Campylobacter* cases are caused by other species. *Campylobacter jejuni* grows best at the body temperature of a bird, and seems to be well adapted to birds, who carry it without becoming ill.

Campylobacteriosis usually occurs in single, sporadic cases, but it can also occur in outbreaks, when a number of people become ill at one time. Most cases of campylobacteriosis are associated with handling raw poultry or eating raw or undercooked poultry meat. A very small number of *Campylobacter* organisms (fewer than 500) can cause illness in humans. Even one drop of juice from raw chicken meat can infect a person. One way to become infected is to cut poultry meat on a cutting board, and then use the unwashed cutting board or utensil to prepare vegetables or other raw or lightly cooked foods.

The *Campylobacter* organisms from the raw meat can then spread to the other foods. The organism is not usually spread from person to person, but this can happen if the infected person is a small child or is producing a large volume of diarrhea. Larger outbreaks due to *Campylobacter* are not usually associated with raw poultry but are usually related to drinking unpasteurized milk or contaminated water.

CLOSTRIDIUM DIFFICILE

Clostridium difficile [klo-STRID-ee-um dif-uh-SEEL] is a bacterium that causes diarrhea and more serious intestinal conditions such as colitis. They are diseases that result from *C. difficile* infections such as Colitis, more serious intestinal conditions, sepsis, and rarely death.

People in good health usually don't get *C. difficile* disease. People who have other illnesses or conditions requiring prolonged use of antibiotics and the elderly are at greater risk of acquiring this disease. The bacteria are found in the feces. People can become infected if they touch items or surfaces that are contaminated with feces and then touch their mouth or mucous membranes. Healthcare workers can spread the bacteria to other patients or contaminate surfaces through hand contact.

E. COLI

Escherichia coli O157:H7 is a leading cause of foodborne illness. Infection with *E. coli* often leads to bloody diarrhea, and occasionally to kidney failure. People can become infected with *E. coli* O157:H7 in a variety of ways. Though most illness has been associated with eating undercooked, contaminated ground beef, people have also become ill from eating contaminated bean sprouts or fresh leafy vegetables such as lettuce and spinach. Person-to-person contact in families and child care centers is also a known mode of transmission. In addition, infection can occur after drinking raw milk and after swimming in or drinking sewage-contaminated water.

Consumers can prevent *E. coli* O157:H7 infection by thoroughly cooking ground beef, avoiding unpasteurized milk, and by washing hands carefully before preparing or eating food. Fruits and vegetables should be washed well, but washing may not remove all contamination. Public service announcements on television, radio, or in the newspapers will advise you which foods to avoid in the event of an outbreak. Because the organism lives in the intestines of healthy cattle, preventive measures on cattle farms, during meat processing, and during the growth, harvest and processing of produce are being investigated.

HEPATITIS A

Hepatitis A is a liver disease caused by the hepatitis A virus. Hepatitis A can affect anyone. In the United States, hepatitis A can occur in situations ranging from isolated cases of disease to widespread epidemics.

Good personal hygiene and proper sanitation can help prevent hepatitis A. Vaccines are also available for long-term prevention of hepatitis A virus infection in persons 12 months of age and older. Immune globulin is available for short-term prevention of hepatitis A virus infection in individuals of all ages.

HEPATITIS B

Hepatitis B is a serious disease caused by a virus that attacks the liver. The virus, which is called hepatitis B virus (HBV), can cause lifelong infection, cirrhosis (scarring) of the liver, liver cancer, liver failure, and death.

Hepatitis B vaccine is available for all age groups to prevent hepatitis B virus infection.

HEPATITIS C

Hepatitis C is a disease of the liver caused by the hepatitis C virus (HCV). You may be at risk for hepatitis C and should contact your medical care provider for a blood test if you:

- were notified that you received blood from a donor who later tested positive for hepatitis C.
- have ever injected illegal drugs, even if you experimented a few times many years ago
- received a blood transfusion or solid organ transplant before July, 1992
- were a recipient of clotting factor(s) made before 1987
- have ever been on long-term kidney dialysis
- have evidence of liver disease (e.g., persistently abnormal ALT levels)

LISTERIA MONOCYTOGENES

Listeriosis, a serious infection caused by eating food contaminated with the bacterium *Listeria monocytogenes*, has recently been recognized as an important public health problem in the United States.

Listeria monocytogenes is found in soil and water. Vegetables can become contaminated from the soil or from manure used as fertilizer. Animals can carry the bacterium without appearing ill and can contaminate foods of animal origin such as meats and dairy products. The bacterium has been found in a variety of raw foods, such as uncooked meats and vegetables, as well as in processed foods that become contaminated after processing, such as soft cheeses and cold cuts at the deli counter. Unpasteurized (raw) milk or foods made from unpasteurized milk may contain the bacterium.

Listeria is killed by pasteurization and cooking; however, in certain ready-to-eat foods such as hot dogs and deli meats, contamination may occur after cooking but before packaging. You get listeriosis by eating food contaminated with *Listeria*.

MRSA

Methicillin-resistant *Staphylococcus Aureus* (MRSA) is a type of staph that is resistant to certain antibiotics. These antibiotics include methicillin and other more common antibiotics such as oxacillin, penicillin and amoxicillin. Staph infections, including MRSA, occur most frequently among persons in hospitals and healthcare facilities (such as nursing homes and dialysis centers) who have weakened immune systems

Most staph infections occur in people with weak immune systems, usually patients in hospitals and long-term care facilities. MRSA infections in hospitalized patients are known as healthcare-associated MRSA (HA-MRSA). People

who have been hospitalized or had surgery within the past year are at high risk for HA-MRSA. People receiving certain treatments, such as dialysis, are also at high risk. MRSA bacteria account for a large percentage of hospital-acquired staph infections.

Over the past several years, MRSA infections in people not considered high-risk have increased. These infections, known as community-associated MRSA (CA-MRSA), occur in otherwise healthy people who have no history of hospitalization in the last year. Many such infections have occurred among athletes who share equipment or personal items (such as towels or razors) and children in daycare facilities.

Overview of Community-Associated (CA) MRSA

MRSA infections that are acquired by persons who have not been recently (within the past year) hospitalized or had a medical procedure (such as dialysis, surgery, catheters) are known as CA-MRSA infections. Staph or MRSA infections in the community are usually manifested as skin infections, such as pimples and boils, and occur in otherwise healthy people.

NORWALK VIRUS

Noroviruses are named after the original strain "Norwalk virus," which caused an outbreak of gastroenteritis in a school in Norwalk, Ohio, in 1968. Currently, there are at least five norovirus genogroups (GI, GII, GIII, GIV and GV), which in turn are divided into at least 31 genetic clusters.

Noroviruses are transmitted primarily through the fecal-oral route, either by consumption of fecally contaminated food or water or by direct person-to-person spread. Environmental and fomite contamination may also act as a source of infection. Good evidence exists for transmission due to aerosolization of vomitus that presumably results in droplets contaminating surfaces or entering the oral mucosa and being swallowed. No evidence suggests that infection occurs through the respiratory system.

ROTAVIRUS

Rotavirus is the most common cause of severe diarrhea among children, resulting in the hospitalization of approximately 55,000 children each year in the United States and the death of over 600,000 children annually worldwide. The disease is characterized by vomiting and watery diarrhea for 3 - 8 days, and fever and abdominal pain occur frequently. Immunity after infection is incomplete, but repeat infections tend to be less severe than the original infection.

The primary mode of transmission is fecal-oral, although some have reported low titers of virus in respiratory tract secretions and other body fluids. Because the virus is stable in the environment, transmission can occur through ingestion of contaminated water or food and contact with contaminated surfaces. In the United States and other countries with a temperate climate, the disease has a winter seasonal pattern, with annual epidemics occurring from November to April.

SALMONELLA

Salmonellosis is an infection with a bacteria called Salmonella. The Salmonella germ is actually a group of bacteria that can cause diarrheal illness in humans. They are microscopic living creatures that pass from the feces of people or animals, to other people or other animals. There are many different kinds of Salmonella bacteria. Salmonella serotype Typhimurium and Salmonella serotype Enteritidis are the most common in the United States.

Salmonella live in the intestinal tracts of humans and other animals, including birds. Salmonella are usually transmitted to humans by eating foods contaminated with animal feces. Contaminated foods usually look and smell normal. Contaminated foods are often of animal origin, such as beef, poultry, milk, or eggs, but all foods, including vegetables may become contaminated. Many raw foods of animal origin are frequently contaminated, but fortunately, thorough cooking kills Salmonella. Food may also become contaminated by the unwashed hands of an infected food handler, who forgot to wash his or her hands with soap after using the bathroom.

SARS

Severe acute respiratory syndrome (SARS) is a viral respiratory illness caused by a coronavirus, called SARS-associated coronavirus (SARS-CoV). SARS was first reported in Asia in February 2003. Over the next few months, the illness spread to more than two dozen countries in North America, South America, Europe, and Asia before the SARS global outbreak of 2003 was contained.

The main way that SARS seems to spread is by close person-to-person contact. The virus that causes SARS is thought to be transmitted most readily by respiratory droplets (droplet spread) produced when an infected person coughs or sneezes.

SHIGELLA DYSENTERIAE

Shigellosis is an infectious disease caused by a group of bacteria called *Shigella*. The *Shigella* germ is actually a family of bacteria that can cause diarrhea in humans. They are microscopic living creatures that pass from person to person. The *Shigella* bacteria pass from one infected person to the next. This happens when basic hygiene and handwashing habits are inadequate. It is particularly likely to occur among toddlers who are not fully toilet-trained. Family members and playmates of such children are at high risk of becoming infected.

Shigella infections may be acquired from eating contaminated food. Contaminated food may look and smell normal. Food may become contaminated by infected food handlers who forget to wash their hands with soap after using the bathroom. Vegetables can become contaminated if they are harvested from a field with sewage in it. Flies can breed in infected feces and then contaminate food.

STAPHYLOCOCCUS AUREUS

Staphylococcus aureus is a common bacterium found on the skin and in the noses of up to 25% of healthy people and animals. *Staphylococcus aureus* is important because it has the ability to make seven different toxins that are frequently responsible for food poisoning.

Staphylococcal food poisoning is a gastrointestinal illness. It is caused by eating foods contaminated with toxins produced by *Staphylococcus aureus*. The most common way for food to be contaminated with *Staphylococcus* is through contact with food workers who carry the bacteria or through contaminated milk and cheeses. *Staphylococcus* is salt tolerant and can grow in salty foods like ham. As the germ multiplies in food, it produces toxins that can cause illness. Staphylococcal toxins are resistant to heat and cannot be destroyed by cooking. Foods at highest risk of contamination with *Staphylococcus aureus* and subsequent toxin production are those that are made by hand and require no cooking. Some examples of foods that have caused staphylococcal food poisoning are sliced meat, puddings, some pastries and sandwiches.

STREPTOCOCCUS

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

The spread of all types of GAS infection can be reduced by good hand washing, especially after coughing and sneezing and before preparing foods or eating. Persons with sore throats should be seen by a doctor who can perform tests to find out whether the illness is strep throat. If the test result shows strep throat, the person should stay home from work, school, or day care until 24 hours after taking an antibiotic. All wounds should be kept clean and watched for possible signs of infection such as redness, swelling, drainage, and pain at the wound site.

VRE

Vancomycin-resistant Enterococci (VRE) are bacteria that are normally present in the human intestines and in the female genital tract and are often found in the environment. These bacteria can sometimes cause infections.

Vancomycin is an antibiotic that is often used to treat infections caused by enterococci. In some instances, enterococci have become resistant to this drug and thus are called vancomycin-resistant enterococci. Most VRE infections occur in hospitals. VISA and VRSA are specific types of antimicrobial-resistant staph bacteria. While most staph bacteria are susceptible to the antimicrobial agent vancomycin some have developed resistance.

Y. ENTEROCOLITICA

Yersiniosis is an infectious disease caused by a bacterium of the genus *Yersinia*. In the United States, most human illness is caused by one species, *Y. enterocolitica*.

Infection is most often acquired by eating contaminated food, especially raw or undercooked pork products. The preparation of raw pork intestines (chitterlings) may be particularly risky. Infants can be infected if their caretakers handle raw chitterlings and then do not adequately clean their hands before handling the infant or the infant's toys, bottles, or pacifiers. Drinking contaminated unpasteurized milk or untreated water can also transmit the infection.