

## The Big Five Organisms

**Norovirus, Hepatitis A Virus, Salmonella Typhi, Shigella SPP., and Escherichia coli O157:H7 are highly infective (have the ability to invade and multiply) and virulent (ability to produce severe disease). A food employee diagnosed with an active case of illness caused by any of these five pathogens must be excluded from food establishments.**

**Norovirus commonly has been known as “Norwalk-like virus”, “Small Round-structured Virus”, and “Winter Vomiting Disease.”**

The CDC estimates that Norovirus is the leading cause of food borne illness in the USA.

**Found:** Found in infected humans and contaminated food.

**Transmission:** Person-to-person by the fecal-oral route and with contaminated food identified as a common vehicle of transmission. Exclusion of food employees exhibiting or reporting diarrhea symptoms is an essential intervention in controlling the transmission of Norovirus from infected food employee’s hands to RTE food items. Norovirus has also been reported to cause disease by airborne transmission when individuals are in close physical proximity to an infected individual vomiting in the facility. Therefore an infected individual vomiting in a food facility increases the risk of infecting employees and consumers. Noroviruses are highly contagious.

**Symptoms:** Acute –onset explosive (or projectile) vomiting, watery non-bloody diarrhea with abdominal cramps, nausea, and occasionally, a low-grade fever. Symptoms usually last 24 to 60 hours. Vomiting is more common in children. Recovery is usually complete and there is no evidence of any serious previous disease. The most common complication is dehydration. 30% individuals infected with Norovirus are asymptomatic.

### Hepatitis A Virus

HAV infection is endemic in developing countries, and less common in industrialized countries with good environmental sanitation and hygienic practices. In the United States, the disease is most common among school-aged children and young adults.

**Found:** Infected human intestinal tract and contaminated water or foods.

The virus is ingested (swallowed), multiplies in the body and liver and is passed in the stool (bowel movements) of the infected person (it is not in the saliva).

**Transmission:** Person-to-person by the fecal-oral route and with fecal contaminated food or water identified as a common vehicle of transmission.

Shedding usually begins with the onset of symptoms and may continue for 2 weeks after recovery. Most outbreaks result from food prepared and handled by workers using poor personal hygiene. The virus can be passed to others when an infected person does not wash his/her hands well after using the restroom (or changing diapers), then prepares foods, or touches objects (such as toys) which others may put in their mouth.

**Symptoms:** Fever, poor appetite, nausea (sometimes vomiting), abdominal pain or cramping, a yellowing of the skin or the whites of the eyes (a condition known as

Jaundice). Symptoms can appear as early as 2 weeks or as late as 6 weeks (15-50 days) after a person has been infected with the virus. For most people the symptoms appear 3-4 weeks (28 days) after being infected with hepatitis A virus.

## Salmonella Typhi

**Found:** Intestinal tracts, feces and urine of infected people.

**Transmission:** The organism is spread by eating or drinking water or foods contaminated from an infected individual. Occasionally, local cases can be traced to exposure from a person who is a chronic carrier, example: Typhoid Mary. Relapses are common. A carrier stage may develop with *S. typhi* from days to years .

**Symptoms:** Commonly referred to as Typhoid, effects may be mild or severe and may include fever, headache, constipation or diarrhea, rose-colored spots on the trunk, an enlarged spleen and liver. Symptoms generally appear 1-3 weeks after exposure.

## Shigella SSP.

Causes an acute bacterial disease, known as shigellosis, and primarily occurs in humans. *Shigella SSP.* is highly infectious and highly virulent. *Shigella SSP.* consists of 4 species, including *S.flexneri*, *S.boydii*, *S. sonnei*, and *S.dysenteriae*, which all differ in pathogenicity. Outbreaks occur in overcrowded conditions where personal hygiene is poor, including institutions such as day care centers and prisons.

**Found:** In the intestinal tracts of infected people and rarely is found in other animals.

**Transmission:** Person-to-person by the fecal-oral route; fecal contamination of food and water. Most outbreaks result from transmission by food, especially salads, prepared and handled by workers using poor personal hygiene.

**Symptoms:** The disease is commonly referred to as "shigellosis" or bacillary dysentery. Diarrhea containing blood and mucus, fever, abdominal cramps, chills, and vomiting; 12 to 50 hours from ingestion of bacteria; can last a few days to 2 weeks.

## Escherichia coli O157:H7

*E. coli* O157:H7 is the most common strain of Enterohemorrhagic *Escherichia coli* (EHEC) or Shiga toxin-producing *Escherichia coli* (STEC) as a cause of foodborne illness in the United States.

**Found:** In the intestinal tracts of some mammals, and raw food products produced by infected animals such as raw milk or raw meat. It may also be found in unchlorinated water. This is one of several strains of *E. coli* that can cause human illness.

**Transmission:** Contaminated water, raw milk, raw or rare ground beef, unpasteurized apple juice or cider, uncooked fruits and vegetables; person-to-person.

**Symptoms:** Diarrhea or bloody diarrhea, abdominal cramps, nausea, and malaise; can begin 2 to 5 days after food is eaten, lasting about 8 days. Some, especially the very young, have developed hemolytic-uremic syndrome (HUS) which may cause acute kidney failure. A similar illness, thrombotic thrombocytopenic purpura (TTP) may occur in adults.