Health Practices on Cruise Ships: Training for Employees

Transcript

Foodborne Illnesses

The Centers for Disease Control and Prevention's Vessel Sanitation Program is proud to bring you the following session: Foodborne Illness. While this presentation is primarily intended for cruise vessels under the jurisdiction of the Vessel Sanitation Program, it may be also used by anyone who is interested in this topic. This session should not be used as a replacement for existing interactive training, but should be used as an adjunct to the comprehensive training program. Foodborne Illness, Causes and Prevention, Vessel Sanitation Program 2007.

For this session, the learning objectives include list individuals who are considered high risk, list the ways in which we can control outbreaks of illness associated with spore-forming bacteria, give an example of bacteria that produces a heat labile, fatal toxin, give an example of a bacteria that produces a heat stable toxin. Additional learning objectives include list the pathogens associated with foodborne illness and the control measures associated with each, list some of the signs and symptoms supervisors should observe food employees for, list the isolation times for food employees and non-food employees.

High risk individuals include the elderly, the very young, immunocompromised individuals, pregnant women, and individuals with underlying illnesses.

Carriers. It is important to understand that there are individuals who can spread illness without displaying symptoms of that illness. It is very important to address asymptomatic individuals who are cabin mates or close contacts of individuals on cruise vessels. There was a very famous incident in public health where a woman by the name of Mary Mallon, also known as "Typhoid Mary," infected several people with salmonella typhi through poor food handling practices. Mary Mallon was tested several times for typhoid, but many of her test results were negative. Nevertheless, Mary passed along the infection to several people she worked for, some of whom died from the infection. Symptomatic carriers are those individuals who show the classic signs and symptoms of infection.

Pathogen categories. Pathogens that cause foodborne illness are classified into three categories: viruses, bacteria, and parasites. Viruses are very small pathogens that require a living host to survive. They reproduce by taking over the infected cell's reproductive mechanism, and instead of producing healthy cells, they produce viruses that go on to infect other cells. Bacteria are complete organisms that can reproduce on their own. They can survive outside and inside the body. Many are beneficial, and some can cause illness, including foodborne illness. Parasites, like viruses, require a host, but only to complete
their life cycle. They can cause foodborne illness, but to a lesser extent than viruses and bacteria.

Transmission of pathogens. In order to prevent many of these pathogens from spreading, it is important to understand the various routes of transmission. Foods can also be contaminated at the source. For example, poultry is contaminated with salmonella and campylobacter during processing. Shell stock can become contaminated in shell stock beds because of sewage-contaminated water. Foods that grow in the ground are contaminated with both bacteria and bacterial spores. Foods that are harvested from the ocean and fresh water can be contaminated with bacteria, viruses, and parasites. Both food and water can be subject to cross-contamination.

Major causes of foodborne illness. Generally in the United States, most foodborne illnesses are attributed to pathogenic bacteria. While this has changed--we now find norovirus to be the number-one cause of foodborne illness in the United States--there are still practices that when done improperly can lead to foodborne illness. Some of these specifically relate to bacteria, while others can relate to any of the pathogen categories. They include improper holding temperatures, either hot or cold holding, improper cooling, leaving food in the temperature danger zone too long, improper cooking or reheating, either the required minimum temperature or the required holding times, infected employees, poor personal hygiene--an example being poor hand washing--cross-contamination--an example might be cutting fresh vegetables on a cutting board previously used to cut raw chicken without proper wash, rinse, and sanitizing between use.

Norovirus, previously known as Norwalk virus. Norovirus can result from fecal contamination of food and water. Food contamination can occur at the source, such as seafood harvested from fecally contaminated waters, or by an infected food handler through poor personal hygiene. On cruise vessels, the major cause of norovirus outbreaks has been attributed to person-to-person spread. Here we will relate norovirus as foodborne or waterborne illness only.

Hepatitis A virus. Hepatitis occurs when food or water are contaminated by feces. This contamination can occur at the source, as in the example of sewage contamination of shellfish beds. The contamination could also come from a food handler. This food handler can either be symptomatic or asymptomatic, as was discussed earlier. The reservoir for hepatitis A is humans.

Bacterial illness characterization. An infection is caused by consuming bacteria that have multiplied in the food. An intoxication is caused by consuming foods where bacteria have produced a toxin. Toxical infection has replaced the term toxin mediated infection and is caused by consuming foods with a bacteria that produces a toxin inside your body. It is important to understand these terms when diagnosing an investigation of foodborne
illness outbreaks. For example, an intoxication is likely to produce symptoms more quickly, with vomiting showing up as the predominant symptom. E. Coli 0157H7 is a toxin-mediated infection when at its most severe can cause death in children due to the toxin produced inside the body of the child.

Clostridium Botulinum. This bacteria produces a fatal toxin. This toxin can also be destroyed by heat at 80 degrees Centigrade. This bacteria produces a spore which makes proper cooling and reheating very important. Outbreaks have been implicated in low acid canned foods, garlic and oil preparations. In addition, outbreaks have been caused by foil-wrapped baked potatoes improperly cooled and then used to make potato salads. And lastly, outbreaks have also resulted from the use of home canned foods.

Staphylococcus aureus. While this bacteria produces a toxin that is heat stable, it is not a fatal toxin. 50% of individuals are carriers of this bacteria in their mucous membranes or on their skin or hair. This pathogen has also been associated with other illnesses of the skin that can be as mild as pimples and infected cuts to sepsis leading to death. Outbreaks have been associated with cold protein salads, meats, and cream pastries. The control measures to prevent Staphylococcus intoxication are proper time and temperature control and good personal hygiene.

Campylobacter jejuni. Poultry is very heavily contaminated with both salmonella and campylobacter because of the way in which it is processed. It is because of this bacterial load that we must cook poultry to 165 degrees Fahrenheit. Outbreaks have been associated with unpasteurized milk as well as poultry products. The most important control measures are avoiding cross-contamination, proper cooking temperatures, and proper hand washing.

E. Coli 0157H7. E. Coli 0157H7 is a toxicoinfection that has caused several deaths in the United States as a result of both foodborne and waterborne illness. In very young children, this pathogen can lead to a shutdown in kidney function. It has been associated with undercooked ground beef, in particular hamburgers, unpasteurized milk, and fecally contaminated drinking water. The control measures to prevent illness include cooking to proper temperatures, avoiding cross-contamination, and good personal hygiene.

Clostridium perfringens. Clostridium perfringens is a toxicoinfection caused by another spore-forming bacteria. It is most commonly associated with meats, gravies, and stews, and many outbreaks have resulted from the reheating of leftovers, giving it the nickname "Leftovers Disease." There are approximately 10,000 cases reported in the United States each year. The control measures to prevent illness include proper time and temperature controls, particularly when reheating foods.

Salmonella species. Salmonellosis can be very severe, even fatal, especially in individuals from the high-risk groups we discussed earlier. The reservoir for this
pathogen is humans and a wide range of other animals, including poultry, reptiles, rodents, dogs, cats, and others. Outbreaks in humans have been associated with dried pig ears fed to dogs. Approximately two to four million cases occur in the United States each year. In institutional settings such as hospitals, person-to-person spread has also been implicated. The control measures include proper cooking, cross-contamination prevention, and good personal hygiene.

Listeria monocytogenes. Listeria monocytogenes can grow well under refrigeration temperatures, although very slowly. This is the basis for the seven-day date marking requirements for refrigerated potentially hazardous foods. This illness can be very severe for pregnant women. There are several outbreaks each year associated with fresh cheeses made from unpasteurized milk. Queso fresco is a cheese that is very popular in the Hispanic community. Outbreaks each year occur in states around the Mexican border. It is important for pregnant women to avoid these types of cheeses because listeriosis can lead to spontaneous abortions or fetal death even if the mother is asymptomatic. The death rate among newborn children can be as high as 50%. The control measures for controlling illness include prevention of cross-contamination and using pasteurized milk.

Toxins-- fish toxins, shellfish toxins, aflatoxins. We will discuss these toxins briefly during the following slides.

Seafood toxins. These seafood toxins are not destroyed by heat. Ciguatera fish poisoning is caused when we consume fish that have fed on toxic algae. The symptoms are a combination of gastrointestinal, neurological, and cardiovascular. This illness is usually self-limiting. Scombroid poisoning is caused when we consume fish contaminated with histamines. These histamines are produced by bacteria on the fish. It is important to point out that this type of poisoning can also occur with other foods that have the appropriate amino acids and bacteria. The symptoms of this illness generally begin with tingling or burning sensations in the mouth. Symptoms can be severe enough to require hospitalization, especially in the elderly. Shellfish poisoning is caused by consuming shellfish that have fed on toxic algae. These toxins accumulate in the shellfish due to the feeding action. This group of toxins can cause paralytic shellfish poisoning, diarrheic shellfish poisoning, amnesic shellfish poisoning, or neurotoxic shellfish poisoning.

Plant toxins. Plant toxins are not destroyed by heat. Examples include certain species of mushrooms, aflatoxins produced by fungi-contaminated grains, and hemlock and jimsonweed or toxic plants.

Parasites. Parasites are destroyed by heat and freezing, and the fish parasites form the basis for the VSP requirements for certificates of parasite destruction. Anisakis simplex and related worms are found in herring, cod, haddock, Pacific salmon, and flounder. Trichinosis used to be a major concern in the U.S. and was typically associated with pork. A change in the feeding practices has led to a reduction in this illness as well as a
reduction in the cooking temperatures for pork. This pathogen is still a major concern in certain wild game populations. Wild game served on a cruise vessel must be from a commercial source. This source must be from an inspected facility.

Toxic chemicals and metals. Toxic chemicals and metals have resulted in foodborne illness. Zinc from using galvanized containers has resulted in zinc poisoning. Copper may leach from copper plumbing and cause people to become ill from copper poisoning. Antimony poisoning may result from the use of enamel ware. Lead poisoning may result from lead leaching from plumbing or solder. The VSP requires that all chemicals used in the galleys are stored properly. Pesticides are required to be stored in locked cabinets outside of the food areas of the vessel.

Physical contaminants. Physical hazards can range from a nuisance to severe injury. Examples of physical contaminants include glass, metal shavings, hair, nail polish, bandages, and cigarette butts and food.

Food employee health. There are several infections in which food employees must be excluded from food service operations. The FDA has included the following in their list: Salmonella typhi, Shigella species, E. Coli 0157H7, Hepatitis A, and now norovirus. Norovirus was added to the 2005 FDA food code. It is not listed in the VSP operations manual, but does fall under the "others" category.

Observe food employees for signs and symptoms. Staphylococcus aureus can be associated with cuts, sores, and open wounds. Norovirus can be associated with diarrhea or vomiting. Hepatitis A can be associated with jaundice. And while coughing, sneezing, and nasal discharge are not associated with gastrointestinal illness, they can be transmitted to food by contamination of hands. Food handlers should be observed for symptoms on a daily basis. When in doubt, send individuals to the medical facility for assessment.

Food employee restriction. Food employees that are diagnosed, suspected of, symptomatic of, or exposed to any of the pathogens listed in the manual are to be restricted from food service work. In addition, in order to return to work, there must be a follow-up required by the medical department, they must be free from symptoms for 48 hours, and they cannot return to work unless it is in writing.

Isolation-- how long? Food employees infected with one of the pathogens discussed earlier are to be isolated for a minimum of 48 hours after the last symptom. The manual requires isolation of non-food employees for a minimum of 24 hours after the last symptom. Please note that food workers may include an engineer who is responsible for cleaning ice machines or a room steward that handles clean glassware. They too are considered to be food workers and must be isolated for a minimum of 48 hours.
Asymptomatic cabin mates and immediate contacts. The VSP operations manual 2005 requires monitoring of asymptomatic cabin mates and immediate contacts of infected persons. They must be restricted from exposure, a verbal interview by either the supervisors or the medical authority is required. They must be advised on personal hygiene procedures and must be monitored for 48 hours after the onset of illness of the case to which they were exposed, and documentation of their restrictions must be maintained.

Passenger illness. For passengers who are ill with acute gastroenteritis, the vessel staff must encourage isolation for a minimum of 24 hours. You can encourage isolation by delivering food to the cabins and providing activities for the ill passengers and their cabin mates. Also, we must provide a written information sheet on personal hygiene and hand washing tips. Please note that it is required to be in writing.

This concludes the foodborne illness presentation. References and resources. For additional information, visit the following Web sites. For CDC, www.cdc.gov. For the Vessel Sanitation Web site, visit www.cdc.gov/nceh/vsp. For additional information from the FDA Web site, visit www.fda.gov, as well as www.cfsan.fda.gov for the Bad Bug Book. And lastly, for the USDA Web site, visit www.usda.gov and www.fsis.usda.gov.