

## Biological and Chemical Hazards found at Retail

Hazard	Associated Foods	Control measures	Onset Time	Duration	Symptoms
Bacillus cereus (diarrheal)	Wide variety including milk, meats, vegetables, and fish	Cooking, cooling, cold holding, hot holding	6-15 hours	24 hours	Abdominal pain, watery stool
Bacillus cereus (emetic)	Rice products and starchy foods, such as potatoes, pasta, cheese, soups, sauces, casseroles, pastries, puddings and salads	Cooking, cooling, cold holding, hot holding	0.5-6 hours	< 24 hours	Nausea, vomiting &/or diarrhea
Campylobacter jejuni	Poultry, raw milk	Cooking, handwashing, prevention of cross contamination	2-5 days	2-10 days	Watery or bloody diarrhea, fever, abdominal pain, nausea, headache, and muscle pain
Clostridium botulinum	Vacuum-packed foods, reduced oxygen packaged foods, under-processed canned foods, garlic-in-oil mixtures, time/temperature abused baked potatoes/sautéed onions	Thermal processing (time + pressure), cooling, cold holding, hot holding, acidification and drying, etc.	18-36 hours	Days-months (possibly fatal)	Weakness, vertigo, followed by double vision and progressive difficulty speaking and swallowing. May include difficulty breathing, muscle weakness, abdominal distention, and constipation
Clostridium perfringens	Cooked meat and poultry, cooked meat and poultry products including casseroles and gravies	Cooling, cold holding, reheating, hot holding	8-22 hours	24-48 hours	Diarrhea and intense abdominal pain
E. coli 0157:H7 (shiga-toxin producing)	Raw ground beef, raw seed sprouts, raw milk, unpasteurized juice, foods contaminated by infected food workers via fecal-oral route	Cooking, no bare hand contact with ready-to-eat foods, employee health policy, handwashing, prevention of cross contamination, pasteurization or treatment of juice	2-9 days	5-10 days	Diarrhea, severe abdominal pain, bloody diarrhea, and Hemolytic uremic syndrome
Listeria monocytogenes	Raw meat and poultry, fresh soft cheese, pate, smoked seafood, deli meats, deli salads	Cooking date-marking, cold holding, handwashing, prevention of cross contamination	Unknown, probably greater than 12 hours for enteric phase, 3-21 days for septic phase.	Weeks	Sepsis (non-specific flu) may have gastrointestinal symptoms of nausea, vomiting and diarrhea, pregnancy infections.
Salmonella spp.	Meat and poultry, seafood, eggs, raw seed sprouts, raw vegetables, raw milk, unpasteurized juice	Cooking, use of pasteurized eggs, employee health policy, no bare hand contact with ready-to-eat foods, handwashing, pasteurization or treatment of juice	6-48 hours	4-7 days	Abdominal pain, headache, nausea, vomiting, fever, diarrhea.
Shigella spp.	Raw vegetables and herbs, other foods contaminated by infected workers via fecal-oral route	Cooking, no bare hand contact with ready-to-eat foods, handwashing, employee health policy	12-50 hours	4-7 days	Abdominal pain, cramps, diarrhea, fever, vomiting, blood, and pus or mucus in stool

Staphylococcus aureus	Ready-to-eat PHF touched by bare hands after cooking and further time/temperature abused	Cooling, cold holding, hot holding, no bare hand contact with ready-to-eat foods, handwashing	1-6 hours	24-48 hours	Nausea, vomiting, retching, abdominal cramping, changes in blood pressure and pulse, prostration
Vibrio vulnificus	Seafood, shellfish	Cooking, approved source, prevention of cross contamination	1-7 days	2-8 days	Gastroenteritis; Individuals with diabetes, cirrhosis, or leukemia, or those who take immunosuppressive drugs or steroids are particularly susceptible to primary septicemia
Yersinia enterocolitica	Raw milk, and unchlorinated water	Follow proper hand washing procedures, use proper cooling, cooking, and reheating temperatures, and avoid cross contamination. Pasteurization will eliminate Yersinia	24-48 hours	1-3 weeks	Diarrhea and/or vomiting, fever and abdominal pain, which mimics appendicitis
Hepatitis A	Shellfish, any food contaminated by infected worker via fecal-oral route	Approved source, no bare hand contact with ready-to-eat foods, handwashing, employee health policy, minimizing bare hand contact with food that is not ready-to-eat	10-50 days (mean of 30 days)	Weeks-months	Fever, nausea, anorexia, abdominal discomfort, jaundice
Hepatitis E	Shellfish, any food contaminated by infected worker via fecal-oral route	Approved source, no bare hand contact with ready-to-eat foods, handwashing, employee health policy, minimizing bare hand contact with food that is not ready-to-eat	15-65 days	Weeks-months	Fever, nausea, anorexia, abdominal discomfort
Rotaviruses, Noroviruses, Reoviruses	Any food contaminated by infected worker via fecal-oral route	No bare hand contact with ready-to-eat foods, handwashing, employee health policy, minimizing bare hand contact with food that is not ready-to-eat	24-48 hours	24-60 hours	Nausea, vomiting, diarrhea, malaise, abdominal pain, headache, and fever
Trichinella spiralis (Parasite)	Pork, bear, and seal meat	cooking	1-2 days/2-8 weeks	months	Nausea, diarrhea, vomiting, fatigue, fever, abdominal discomfort, Headaches, fevers, chills, cough, eye swelling, aching joints and muscle pains, itchy skin, diarrhea, or constipation
Anisakis simplex (Parasite)	Various fish (cod, haddock, fluke, pacific salmon, herring, flounder, monkfish)	Cooking, freezing	~ 2 weeks	3 weeks	Extreme pain