

### Common Foodborne Pathogens\*

Pathogen	Common Name of Illness	Cause of Illness	Incubation Period	Symptoms	Possible sources	Steps for Prevention
<i>Bacillus cereus</i>	<i>B. cereus</i> food poisoning	large molecular weight protein (diarrheal type) or highly heat-stable toxin (emetic type)	30 minutes to 15 hours	Watery diarrhea, abdominal cramps, nausea, and vomiting (emetic type)	Meats, milk, vegetables, fish, rice, potatoes, pasta, and cheese	Proper holding temperatures
<i>Campylobacter jejuni</i>	Campylobacteriosis	Infection, even with low numbers	One to seven days	Nausea, fever, abdominal cramps, diarrhea, headache - varying in severity	Raw milk, eggs, poultry, raw beef, cake icing, water	Pasteurize milk; cook foods properly; prevent cross-contamination.
<i>Clostridium botulinum</i>	Botulism	Toxin produced by <i>Clostridium botulinum</i>	12 to 36 hours	Nausea, vomiting, diarrhea, fatigue, headache, dry mouth, double vision, muscle paralysis, respiratory failure	Low-acid canned foods, meats, sausage, fish	Properly can foods following recommended procedures; cook foods properly.
<i>Clostridium perfringens</i>	<i>Clostridium perfringens</i> food poisoning	Inadequate cooling, improper reheating, holding temperatures	8 to 22 hours	abdominal cramps and diarrhea, some include dehydration	Meats and gravies	Rapid cooling and reheating. Not holding product in temperature range allowing growth
<i>Escherichia coli</i> O157:H7	<i>E. coli</i> infection	Strain of enteropathic <i>E. coli</i>	Two to four days	Hemorrhagic colitis, possibly hemolytic uremic syndrome	Ground beef, raw milk	Thoroughly cook meat; no cross-contamination.

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Hepatitis A	Hepatitis	Hepatitis A Virus	2 to 4 weeks	fever, malaise, nausea, abdominal discomfort, yellow eyes and skin	Water, fruits, vegetables, iced drinks, shellfish, and salads	Proper hand washing before after using a restroom and before preparing food
<i>Listeria monocytogenes</i>	Listeriosis	Infection with <i>Listeria monocytogenes</i>	Two days to three weeks	Flu-like symptoms, meningitis, septicemia, miscarriage	Vegetables, milk, cheese, meat, deli meat, hot dogs, seafood	Purchase pasteurized dairy products; cook foods properly; no cross-contamination; use sanitary practices.
Norwalk, Norwalk-like, or Norovirus	Viral gastroenteritis, winter diarrhea, acute non-bacterial gastroenteritis, food poisoning, and food infection	Infection with Norwalk virus	Between 12 and 48 hours (avg 36 hours); duration, 12-60 hours	Nausea, vomiting, diarrhea and abdominal cramps, fever, headache	raw oysters/shellfish, water and ice, salads, frosting, person-to-person contact	Adequate and proper treatment and disposal of sewage, appropriate chlorination of water, restriction of infected food handlers from working with food until they no longer shed virus.
<i>Salmonella</i>	Salmonellosis	Infection with <i>Salmonella</i> species	12 to 24 hours	Nausea, diarrhea, abdominal pain, fever, headache, chills, prostration	Meat, poultry, egg or milk products	Cook thoroughly; avoid cross-contamination; use sanitary practices.

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<i>Staphylococcus aureus</i>	Staphylococcal food poisoning	Toxin produced by certain strains of <i>Staphylococcus aureus</i>	One to six hours	Severe vomiting, diarrhea, abdominal cramping	Custard- or cream-filled baked goods, ham, poultry, dressing, gravy, eggs, potato salad, cream sauces, sandwich fillings	Refrigerate foods; use sanitary practices

\*compiled from Iowa State University Extension Food Safety Project, FDA Bad Bug Book, and Foodborne Illness-Causing Organisms in the U.S. What You Need to Know

LIMITING CONDITIONS FOR PATHOGEN GROWTH*							
PATHOGEN	MIN AW (USING SALT)	MIN PH	MAX PH	MAX. % WATER PHASE SALT	MIN. TEMP. (°F)	MAX TEMP (°F)	OXGEN REQUIREMENT
BACILLUS CEREUS	0.92	4.3	9.3	10	39.2	131	facultative anaerobe
C. BOTULINUM TYPE A, AND PROTEOLYTIC TYPES B & F	0.935	4.6	9	10	50	118.4	anaerobic
C. BOTULINUM TYPE E, AND NONPROTEOLYTIC TYPES B & F	0.97	5	9	5	37.9	113	anaerobic
C. PERFRINGENS	0.93	5	9	7	50	125.6	anaerobic
PATHOGENIC STRAINS OF ESCHERICHIA COLI	0.95	4	10	6.5	43.7	120.9	facultative anaerobe
LISTERIA MONOCYTOGENES	0.92	4.4	9.4	10	31.3	113	facultative anaerobe
SALMONELLA SPP.	0.94	3.7	9.5	8	41.4	115.22	facultative anaerobe
STAPHYLOCOCCUS AUREUS GROWTH	0.83	4	10	20	44.6	122	facultative anaerobe
STAPHYLOCOCCUS AUREUS TOXIN FORMATION	0.85	4	9.8	10	50	118	facultative anaerobe
CAMPYLOBACTER JEJUNI	0.987	4.9	9.5	1.7	86	113	micro aerophilic

\*Other Conditions Optimal

Fish and Fishery Products Hazards and Controls Guide-references in Guide