

Agent	Usual Incubation Period (Range) ²	Symptom Profile	Duration of Illness ³	Period of Communicability	Characteristic Foods ⁴	Criteria for confirmation
						Type and amount of specimens; handling requirements for shipping to OSPHL*
I. Agents typified by nausea and vomiting, <i>without fever</i>, within 8 hours of eating						
<i>Bacillus cereus</i> ("emetic" variety)	2-4 hours (1-6 hours)	Vomiting, with nausea and diarrhea (abrupt onset)	24 hours	Not communicable (preformed enterotoxin)	Fried rice, meats, vegetables	Isolation of 10 ⁵ organisms per gram from stool of two or more ill persons OR isolation of 10 ⁵ organisms per gram from epidemiologically implicated food Collect at least 2 grams of fresh stool (pea size) within three days of illness and refrigerate prior to shipment. DO NOT FREEZE, DO NOT send in transport medium. Ship in a cold pack to OSPHL* with OSPHL Form 60, Request for Bacteriology/ Parasitology (available at http://oregon.gov/DHS/ph/phl/docs/75.pdf); must be ordered, not part of OSPHL routine enteric screening Collect 50-150 grams (about 2-6 oz.) of food
<i>Staphylococcus aureus</i>	2-4 hours (30 minutes-8 hours)	Vomiting, with nausea, cramps, and diarrhea (abrupt onset)	24-48 hours	Not communicable (preformed enterotoxin)	Sliced/chopped ham and meats, custards, cream fillings, mushrooms, egg salad	Isolation of organism of same phage type from stool or vomitus of two or more ill persons OR detection of enterotoxin in epidemiologically implicated food OR isolation of 10 ⁵ organisms per gram from epidemiologically implicated food Collect at least 2 grams of fresh stool (pea-sized) within three days of illness and refrigerate prior to shipment. DO NOT FREEZE, DO NOT send in transport medium. Ship in a cold pack to OSPHL* with OSPHL Form 60, Request for Bacteriology/ Parasitology (available at http://oregon.gov/DHS/ph/phl/docs/75.pdf); must be ordered, not part of OSPHL routine enteric screening Collect at least 100 grams (4 oz.) of food

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II. Agents typified by abdominal cramps and diarrhea, <i>without fever</i>, within 24 hours of eating						
<i>Bacillus cereus</i> ("diarrheal" variety)	6-24 hours	Cramps and diarrhea	24-48 hours	Not communicable (enterotoxin formed in vivo)	Fried rice, meats, vegetables	<p>Isolation of 10⁵ organisms per gram from stool of two or more ill persons and not from stool of control patients OR isolation of 10⁵ organisms per gram from epidemiologically implicated food</p> <hr/> <p>Collect at least 2 grams of fresh stool (pea-sized) within three days of illness and refrigerate prior to shipment. DO NOT FREEZE, DO NOT send in transport medium. Ship in a cold pack to OSPHL* with OSPHL Form 60, Request for Bacteriology/ Parasitology (available at http://oregon.gov/DHS/ph/phl/docs/75.pdf); must be ordered, not part of OSPHL routine enteric screening Collect 50-150 grams (about 2-6 oz.) of food</p>
<i>Clostridium perfringens</i>	10-12 hours (6-24 hours)	Cramps and diarrhea	24-48 hours	Not communicable (enterotoxin formed in vivo)	Meat, poultry, gravy, Mexican foods	<p>Isolation of 10⁶ organisms per gram from stool of two or more ill persons OR demonstration of enterotoxin in the stool of two or more ill persons OR isolation of 10⁵ organisms per gram from epidemiologically implicated food</p> <hr/> <p>Collect at least 2 grams of fresh stool (pea-sized) within three days of illness and refrigerate prior to shipment. DO NOT FREEZE, DO NOT send in transport medium. Ship in a cold pack to OSPHL* with OSPHL Form 60, Request for Bacteriology/ Parasitology (available at http://oregon.gov/DHS/ph/phl/docs/75.pdf); must be ordered, not part of OSPHL routine enteric screening A loss of viability of <i>C. perfringens</i> will occur if foods are frozen or held under prolonged refrigeration</p>

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III. Agents typified by abdominal cramps and diarrhea, with fever, within 12-48 hours of eating						
<i>Campylobacter jejuni</i>	48 hours-5 days (24 hours-10 days)	Cramps and diarrhea (sometimes bloody), with vomiting and fever	48 hours-10 days	2-7 weeks	Raw milk, poultry, water	<p>Isolation of organism from clinical specimens from two or more ill persons OR isolation of organism from epidemiologically implicated food</p> <hr/> <p>Swab fecal material from stool specimens and insert into a tube of Cary-Blair transport medium (this is a very fragile organism, so transport in Cary-Blair is very important). Ship in a cold pack to OSPHL* with OSPHL Form 60, Request for Bacteriology/Parasitology (available at http://www.oshd.org/vi/form75.pdf); must be ordered, not part of OSPHL routine enteric screening Collect 50-150 grams (about 2-6 oz.) of food</p>
<i>Escherichia coli</i> Enteroinvasive (EIEC)	12-48 hours	Cramps and diarrhea, with fever, headache	5-10 days	Weeks to months	Uncooked vegetables, salads, water, cheese	<p>Isolation of same enteroinvasive serotype from stool of two or more ill persons</p> <hr/> <p>Swab fecal material from stool specimens and insert into a tube of Cary-Blair transport medium. Ship in a cold pack to OSPHL* with OSPHL Form 60, Request for Bacteriology/ Parasitology (available at http://www.oshd.org/vi/form75.pdf); must be ordered, not part of OSPHL routine enteric screening Collect 25-100 grams (about 1-4 oz.) of food</p>

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<i>Salmonella</i> (non-typhoid)	3-4 days (1-5 days) [according to OHPD] 12-36 hours (6 hours-10 days) [according to everyone else]	Cramps and diarrhea, with vomiting and fever	4-7 days	Several days to several years, depending on type Concentrations/infectivity typically higher when symptomatic	Poultry, eggs, meat, raw milk (cross-contamination important)	Isolation of organism of same serotype from clinical specimens from two or more ill persons OR isolation of organism from epidemiologically implicated food Swab fecal material from stool specimens and insert into a tube of Cary-Blair transport medium. Ship in a cold pack to OSPHL* with OSPHL Form 60, Request for Bacteriology/ Parasitology (available at http://oregon.gov/DHS/ph/ph/docs/75.pdf); included in OSPHL routine enteric screening Collect 50-150 grams (about 2-6 oz.) of food if available; dehydrated specimens may be kept at room temperature until analysis. Frozen food should remain frozen. All other specimens should be refrigerate prior to shipment until analysis
<i>Shigella</i>	24-48 hours (12 hours-6 days)	Cramps and diarrhea (may be bloody), with fever	4-7 days	4 weeks after illness	Eggs, salads, lettuce	Isolation of organism of same serotype from clinical specimens from two or more ill persons OR isolation of organism from epidemiologically implicated food Swab fecal material from stool specimens and insert into a tube of Cary-Blair transport medium. Ship in a cold pack to OSPHL* with OSPHL Form 60, Request for Bacteriology/ Parasitology (available at http://oregon.gov/DHS/ph/ph/docs/75.pdf); included in OSPHL routine enteric screening Collect at least 25 grams (about 1 oz.) of food if available. The sample should be held at 4°C (39°F) if it is to be analyzed within 24 hours, and frozen if it is to be held longer than 24 hours

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<i>Vibrio parahaemolyticus</i>	12-24 hours (2-48 hours)	Cramps watery, diarrhea, with nausea, vomiting, and fever	2-5 days	Not communicable	Seafood, especially crabs and oysters	<p>Isolation of Kanagawa-positive organism from stool of two or more ill persons OR isolation of 10⁵ organisms per gram from epidemiologically implicated food</p> <p>Swab fecal material from stool specimens and insert into a tube of Cary-Blair transport medium. Ship in a cold pack to OSPHL* with OSPHL Form 60, Request for Bacteriology/ Parasitology (available at http://oregon.gov/DHS/ph/phl/docs/75.pdf); must be ordered, not part of OSPHL routine enteric screening</p> <p>Collect at least 50 grams (about 2 oz.) of food for possible confirmatory testing and DO NOT FREEZE</p>
<i>Yersinia enterocolitica</i>	36-48 hours (24 hours-10 days)	Cramps, diarrhea, fever, headache, vomiting, pseudo-appendicitis	1-3 weeks	2-3 weeks	Milk, tofu, pork	<p>Isolation of organism from clinical specimens from two or more ill persons OR isolation of organism from epidemiologically implicated food</p> <p>Swab fecal material from stool specimens and insert into a tube of Cary-Blair transport medium. Ship in a cold pack to OSPHL* with OSPHL Form 60, Request for Bacteriology/ Parasitology (available at http://oregon.gov/DHS/ph/phl/docs/75.pdf); must be requested, not in routine enteric screen</p> <p>Collect 50-150 grams (about 2-6 oz.) of food for possible confirmatory testing</p>

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IV. Agents typified by vomiting, diarrhea, cramps, myalgias and headache <i>with fever</i>, within 24 hours of eating						
<i>Listeria monocytogenes</i>	24 hours (9-50 hours)	Fever, with diarrhea, myalgia, headache Usual symptom profile: fever 72% diarrhea 68% myalgia 56% cramps 55% vomiting 35%	3-7 days	Not known	Inadequately pasteurized milk, pre-cooked meat	Isolation of <i>Listeria monocytogenes</i> of the same serotype from two or more ill persons exposed to epidemiologically implicated food or to food from which the same-type <i>Listeria monocytogenes</i> has been isolated Swab fecal material from stool specimens and insert into a tube of Cary-Blair transport medium. Ship in a cold pack to OSPHL* with OSPHL Form 60, Request for Bacteriology/Parasitology (available at http://oregon.gov/DHS/ph/phl/docs/75.pdf); must be requested, not in routine enteric screen Collect 50-150 grams (about 2-6 oz.) of food
V. Agents typified by vomiting, diarrhea, myalgias and headache <i>without fever</i>, within 24-48 hours of eating						
Norwalk virus and other caliciviruses	24-48 hours (10-72 hours)	Vomiting, with diarrhea, headache and myalgia Usual symptom profile: diarrhea 80% vomiting 60% nausea 75% fever 30%	24-72 hours	Duration of vomiting and diarrhea	Shellfish, water, salads, frosting, "handled" foods	Detection of viral RNA in stool or vomitus by reverse transcriptase-polymerase chain reaction (RT-PCR) OR visualization of small, round-structured viruses (SRSV) that react with patient's convalescent sera but not acute sera, by immune-electron microscopy OR more than fourfold rise in antibody titer to Norwalk virus or Norwalk-like virus in acute and convalescent sera in most serum pairs Collect 15-20 grams of whole stool (walnut-sized) OR 10-15 ml of diarrheal stool (about 3 tablespoons). DO NOT send in transport medium; collect within 72 hours of onset for recovery of virus. Ship in a cold pack to OSPHL* with OSPHL form 42, Virology/ Immunology Request (available at http://oregon.gov/DHS/ph/phl/docs/42.pdf) Collect 50-150 grams (about 2-6 oz.) of food

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VI. Agents typified by watery diarrhea and headache <i>without fever</i>, within 24-48 hours of eating						
<i>Escherichia coli</i> enterotoxigenic (ETEC) ⁵	24-48 hours (21-68 hours)	Cramps, watery diarrhea, some vomiting Usual symptom profile: diarrhea 80-100% cramps 82% vomiting <50% nausea <50% fever <50% myalgia <50% headache <50%	24 hours-11 days (medium 3 days)	Weeks to months	Seafood (crab, shrimp and scallops), salads and other foods served cold	Isolation of organism of same serotype, demonstrated to produce heat-stable (ST) and/or heat labile (LT) enterotoxin from stool of two or more ill persons Swab fecal material from stool specimens and insert into a tube of Cary-Blair transport medium. Ship in a cold pack to OSPHL* with OSPHL Form 60, Request for Bacteriology/Parasitology (available at http://oregon.gov/DHS/ph/phl/docs/75.pdf); must be requested, not in routine enteric screen; will be sent to CDC for testing Collect 50-150 grams (about 2-6 oz.) of food
<i>Vibrio cholerae</i> O1 and O139	24-72 hours (12 hours-5 days)	Diarrhea, vomiting water?	72 hours-7 days	Usually a few days after recovery except carrier state	Shellfish, water or foods contaminated by infected food handlers	Isolation of toxigenic organism from stool or vomitus of two or more ill persons OR significant rise in vibriocidal, bacterial-agglutinating, or antitoxin antibodies in acute- and early convalescent phase sera among persons not recently immunized OR isolation of toxigenic organism from epidemiologically implicated food Swab fecal material from stool specimens and insert into a tube of Cary-Blair transport medium. Ship in a cold pack to OSPHL* with OSPHL Form 60, Request for Bacteriology/ Parasitology (available at http://oregon.gov/DHS/ph/phl/docs/75.pdf); must be requested, not in routine enteric screen Collect 50-150 grams (about 2-6 oz.) of food. Food samples should be held under moderate refrigeration (approx. 10°C or 50°F) to maximize survival and recovery of vibrios and reduce the tendency for overgrowth by indigenous microflora

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<i>Vibrio cholerae</i> non-O1 and non-O139	12-24 hours (12 hours-5 days)	Profuse watery diarrhea and vomiting, which can lead to severe dehydration and death within hours	72 hours-7 days; causes life-threatening dehydration	Several days	Shellfish	<p>Isolation of organism of same serotype from stool of two or more ill persons</p> <p>Swab fecal material from stool specimens and insert into a tube of Cary-Blair transport medium. Ship in a cold pack to OSPHL* with OSPHL Form 60, Request for Bacteriology/ Parasitology (available at http://oregon.gov/DHS/ph/phl/docs/75.pdf); must be requested, not in routine enteric screen</p> <p>Collect 50-150 grams (about 2-6 oz.) of food</p>
VII. Agents typified by bloody diarrhea <i>without fever</i>, within 48 hours of eating						
<i>Escherichia coli</i> enterohemorrhagic (<i>E. coli</i> O157:H7 & others)	48 hours-8 days (24 hours-10 days)	Bloody diarrhea, with cramps, vomiting, fever; hemolytic uremic syndrome (2-7% of cases)	5-10 days	1-4 weeks	Beef, venison, raw milk, water, produce	<p>Isolation of <i>E. coli</i> O157:H7 or other shiga-like toxin producing <i>E. coli</i> from clinical specimens from two or more ill persons OR isolation of <i>E. coli</i> O157:H7 or other shiga-like toxin producing <i>E. coli</i> from epidemiologically implicated food</p> <p>Swab fecal material from stool specimens and insert into a tube of Cary-Blair transport medium. Ship in a cold pack to OSPHL* with OSPHL Form 60, Request for Bacteriology/ Parasitology (available at http://oregon.gov/DHS/ph/phl/docs/75.pdf)</p>

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VIII. Botulism						
<i>Clostridium botulinum</i>	12-48 hours (2 hours to 8 days)	Nausea, vomiting, diarrhea, with or just before onset of descending paralysis	Days to months	Not communicable (preformed enterotoxin)	Improperly canned or similarly preserved foods; honey (infants)	Detection of botulinum toxin in serum, stool, gastric contents, or implicated food OR isolation of organism from stool or intestine Collect at least 5 cc of serum and/or at least 1 gram of stool and/or food
IX. Agents most readily diagnosed from the history of eating a particular type of food						
Heavy Metals (antimony, arsenic, cadmium, copper, iron, lead, mercury, tin, zinc)	5 minutes--8 hours (usually <1 hour)	Vomiting, with nausea, cramps, and diarrhea	Usually self-limited	Not communicable	Acidic foods and beverages prepared, stored or cooked in containers coated, lined or contaminated with offending metal	Demonstration of high concentration of metal in epidemiologically implicated food Collect suspect food or metal container
Poisonous mushrooms (muscimol, muscarine, psilocybin, coprinus atremmentaris, ibotenic acid)	<2 hours	Vomiting, diarrhea, confusion, visual disturbances, salivation, diaphoresis, hallucinations, disulfiram-like reaction	Usually self-limited	Not communicable	Wild mushrooms	Clinical syndrome among persons who have eaten mushroom identified as toxic type, OR demonstration of toxin in epidemiologically implicated mushroom or food containing mushrooms Collect mushrooms or food containing mushrooms
Shellfish poisoning (diarrhetic, neurotoxic, amnesic)	20 minutes--2 hours	Cramps, diarrhea, headaches, vomiting, amnesia, seizures	Days	Not communicable	Mussels, oysters	Detection of toxin in epidemiologically implicated food OR detection of large numbers of shellfish-poisoning-associated species of dinoflagellates in water from which epidemiologically implicated mollusks are gathered

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Ciguatera poisoning	1-6 hours; usually within 24 hours	Diarrhea, nausea, vomiting, paresthesias, reversal of temperature sensation	Days to weeks to months	Not communicable	Large ocean fish (grouper, amberjack barracuda, snapper)	Demonstration of ciguatoxin in epidemiologically implicated fish, OR clinical syndrome among persons who have eaten a type of fish previously associated with ciguatera fish poisoning
						Collect epidemiologically implicated fish
Scombroid fish poisoning (histamine fish poisoning)	1 minute-3 hours; usually within 6 hours	Cramps, diarrhea, headache, nausea, flushing, urticaria	3-6 hours	Not communicable	Mishandled fish (mahi-mahi, tuna, mackerel, bluefish, salmon, bonito, skipjack)	Demonstration of histamine in epidemiologically implicated fish, OR clinical syndrome among persons who have eaten a type of fish previously associated with histamine fish poisoning (fish of order Scombroidei)
						Collect epidemiologically implicated fish
Paralytic shellfish poisoning	30 minutes-3 hours	Paresthesias, feeling of floating, loss of balance, dry mouth, double vision, dysarthria, shortness of breath	Days	Not communicable	Clams, mussels, cockles	Detection of toxin in epidemiologically implicated fish, OR detection of large numbers of shellfish-poisoning-associated species of dinoflagellates in water from which epidemiologically implicated mollusks are gathered
						Collect epidemiologically implicated fish

Acknowledgements and Notes

1. The *OHS Compendium of Acute Food-borne Diseases* is based on a similar table developed by epidemiologists at the Food-borne and Diarrheal Disease Branch, Division of Bacterial and Mycotic Diseases, National Center for Infectious Diseases, Centers for Disease Control and Prevention, and on Tauxe RV, Hughes JM. Food-Borne Disease. In: Mandell GL, Benne HJE, Dolin R. Principles and Practice of Infectious Disease 4th ed. NY: Churchill Livingstone; 1995, page 1017 (table 6).
2. CDC. Diagnosis and management of food-borne illness: a primer for physicians. MMWR 2001; 50(RR2). Reprinted with the permission of the American Medical Association; the Center for Food Safety and Nutrition, FDA and the Food Safety Inspection Service, USDA. Available on-line at <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5002a1.htm>
3. CDC. Guide to confirming the diagnosis in in food-borne diseases at http://www.cdc.gov/ncidod/dbmd/outbreak/guide_fd.htm
4. Chin, J, Ed. Control of Communicable Disease Manual. Washington, D.C.: American Public Health Association, 2000.
5. CDC. Diagnosis and management of food-borne illness: a primer for physicians. MMWR 2001; 50(RR2). Reprinted with the permission of the American Medical Association; the Center for Food Safety and Nutrition, FDA and the Food Safety Inspection Service, USDA. Available on-line at <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5002a1.htm>
6. "Characteristic foods" for each FBD agent are based on epidemiological data gathered by epidemiologists in the Acute and Communicable Disease Program, Center for Disease Control and Epidemiology, Oregon Health Division, and on Tauxe RV, Hughes JM. Food-Borne Disease. In: Mandell GL, Benne HJE, Dolin R. Principles and Practice of Infectious Disease 4th ed. Oregon State Public Health Laboratory (OSHPL), 3150 NW 229th Avenue, Suite 100, Hillsboro, Oregon, 97124 503/693-4100; August 14, 2001; February 26, 2004; August 30, 2008

NY: Churchill Livingstone; 1995, page 1017 (table 6).

5. Symptom profiles and characteristic foods are taken from Dalton CB, Mintz ED, Wells JG et al. Outbreaks of enterotoxigenic *Escherichia coli* infection in American adults: a clinical and epidemiologic profile. *Epidemiol Infect* 1999; 123:9-16.