APPENDIX 1: Table of Foodborne Illnesses and Associated Clinical Characteristics

Bacterial Agents: Table of Foodborne Illnesses and Associated Clinical Characteristics [1]

Agent	Usual Incubation Period (Range)[2,3,4]	Signs and Symptoms[2,3,4]	Duration[2,3]	Associated foods[2]	Period of Communicability[2,3]	CDC criteria for outbreak confirmation[5] SLD Test Kit See SLD Biological Sciences Bureau directory of services for up to date information https://nmhealth.org/about/sld/
Bacillus cereus (diarrheal form)	6-24 hours	Abdominal cramps, watery diarrhea, nausea.	24-48 hours	Meats, stews, gravies, vanilla sauce.	Not communicable (enterotoxin formed in vivo).	Isolation of organism from stool of two or more ill persons OR isolation of 10^5 organisms/g from epidemiologically implicated food. Contact Environmental Micro section regarding food collection 505 383-9129 Enteric Transport Kit (ETM). Refrigerate not frozen, place in container. Stool in ETM must be received at SLD within 48 hours of collection.
Bacillus cereus (emetic form)	1-6 hours	Sudden onset of severe nausea and vomiting, diarrhea may be present.	24 hours	Improperly refrigerated cooked and fried rice, meats.	Not communicable (preformed enterotoxin).	Isolation of organism from stool of two or more ill persons and not from stool of control patients OR isolation of 10^5 organisms/g from epidemiologically implicated food, provided specimen is properly handled. Enteric Transport Kit (Refrigerate not frozen, place in container without preservative, vomitus must be without preservative). Must be received at SLD within 24 hours of collection
Brucellosis (*Brucella abortus, B. melitensis, B. suis*)	Several days to several months; usually >30 days	Fever, chills, sweating, weakness, headache, muscle and joint pain, diarrhea, bloody stool during acute phase.	Weeks	Unpasteurized milk, unpasteurized cheese, contaminated meat.	Not known to be communicable from person-to-person.	Two or more ill persons and isolation of organism in culture of blood or bone marrow; greater than fourfold increase in standard agglutination titer (SAT) over several weeks, or single SAT 1:160 in person who has compatible clinical symptoms and history of exposure. Call SLD General Microbiology (505-383-9128) for blood culture options and SLD Virology/Serology (505-383-9124) for antibody titer serology. Blood for testing must be separated and serum frozen.

Agent	Usual Incubation Period (Range)[2,3,4]	Signs and Symptoms[2,3,4]	Duration[2,3]	Associated foods[2]	Period of Communicability[2,3]	CDC criteria for outbreak confirmation[5] **SLD Test Kit** **See SLD Biological Sciences Bureau directory of services for up to date information https://nmhealth.org/about/sld/**
Campylobacter	2-10 days; usually 2-5 days	Diarrhea, cramps, vomiting and fever; diarrhea may be bloody.	2-10 days	Raw and undercooked poultry, unpasteurized milk, contaminated water.	Excreted for 2-7 weeks; uncommon to have person-to-person spread.	Isolation of organism from clinical specimens from two or more ill persons OR isolation of organism from epidemiologically implicated food. Contact Env. Micro section regarding food collection 505 383-9129 Enteric Transport Kit. Refrigerate, must be in preservative. Must be received at SLD within 48 hours of collection.
Clostridium botulinum (Foodborne botulism)	2 hrs-8 days; usually 12-48 hrs.	Vomiting, diarrhea, blurred vision, diplopia, dysphagia, descending muscle weakness.	Days to months, can be complicated by respiratory failure and death	Home-canned foods with a low acid content, improperly canned commercial foods, home-canned or fermented fish, foil-wrapped baked potatoes.	Not communicable (preformed enterotoxin)	Detection of botulinum toxin in serum, stool, gastric contents, or implicated food OR isolation of organism from stool or intestine. Stool, serological and food testing available only through CDC. Call SLD General Microbiology (505-383-9128) for specimen collection and shipping requirements.
Clostridium botulinum (infant botulism)	3-30 days	Infants <12 months: lethargy, weakness, poor feeding, constipation, poor gag and sucking reflex.	Variable	Raw honey, home-canned vegetables and fruits, corn syrup. (Majority of cases not associated with food)	Not communicable (preformed enterotoxin).	Detection of botulinum toxin in serum, stool, gastric contents, or implicated food OR isolation of organism from stool or intestine. Food testing available only through CDC. Call SLD Environmental Microbiology (505-383-9129) for food collection and transport requirements.
Clostridium perfringens	6-24 hours	Watery diarrhea, nausea, abdominal cramps.	24-48 hours	Meats, poultry, gravy, dried or precooked foods.	Not communicable (enterotoxin formed in vivo).	Isolation of 10^6 organisms/g from stool of two or more ill persons, provided specimen is properly handled OR demonstration of enterotoxin in the stool of two or more ill persons OR isolation of 10^5 organisms/g from epidemiologically implicated food, provided specimen is properly handled. For stool cultures, Enteric Transport Kit (with or without preservative, must be refrigerated) must be received at SLD within 48 hours of collection. Contact Env. Micro section regarding food collection 505 383-9129

Agent	Usual Incubation Period (Range)[2,3,4]	Signs and Symptoms[2,3,4]	Duration[2,3]	Associated foods[2]	Period of Communicability[2,3]	CDC criteria for outbreak confirmation[5] SLD Test Kit See SLD Biological Sciences Bureau directory of services for up to date information https://nmhealth.org/about/sld/
Enterohemorrhagic *E. coli* (EHEC) including *E. coli* O157:H7 and other Shiga toxin-producing *E. coli* (STEC)	1-10 days; usually 3-4 days	Diarrhea that is often bloody, severe abdominal pain; fever occurs in less than 1/3 of cases.	5-10 days	Ground beef, unpasteurized milk and juice, fresh produce, ingestion of contaminated water also contact in petting zoos (sheep, deer, calves).	For the duration of excretion of the pathogen; typically a week or less in adults, but 3 weeks in 1/3 of children	Isolation of E. coli O157:H7 or other Shiga-like toxin-producing E. coli from clinical specimen from two or more ill persons OR isolation of E. coli O157:H7 or other Shiga-like toxin-producing E. coli from epidemiologically implicated food. Enteric Transport Kit (Stool in preservative, refrigerated). Must be received at SLD within 48 hours of collection. Contact Env. Micro section regarding food collection 383-9129
Enterotoxigenic E. coli (ETEC)	6-48 hrs.	Diarrhea, abdominal cramps, nausea; vomiting and fever less common	3-7 days or longer	. Contaminated fruits, vegetables and water.	For the duration of excretion of the pathogen, this may be prolonged. (Rare in the US, more common in infants and travelers to resource limited countries)	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. Testing not available at SLD.
Listeria monocytogenes	1-6 wks.	Fever, muscle aches and nausea or diarrhea. Pregnant women may have mild flu-like illness and infection may lead to miscarriage. High risk patients may have meningitis or sepsis. Neonates may have pneumonia, sepsis or meningitis	Variable	Unpasteurized milk, fresh soft cheeses, ready-to-eat deli meats, hot dogs, melons, fruit salads	Infected persons can shed the organism for a week to several months.	Isolation of organism of same serotype from stool of two or more ill persons exposed to food that is epidemiologically implicated or from which organism of same serotype has been isolated. Stool culture not useful. CSF or blood serum collected and cultured at SLD. Call General Microbiology (505-383-9128) for more detail. Contact Env. Micro section regarding food collection 383-9129

Agent	Usual Incubation Period (Range)[2,3,4]	Signs and Symptoms[2,3,4]	Duration[2,3]	Associated foods[2]	Period of Communicability[2,3]	CDC criteria for outbreak confirmation[5] **SLD Test Kit** **See SLD Biological Sciences Bureau directory of services for up to date information https://nmhealth.org/about/sld/**
Salmonella species (non-typhi)	6 hrs-10 days; usually 6-48 hrs.	Diarrhea, fever, abdominal pain, nausea, headache.	4-7 days	Eggs, poultry, meat, unpasteurized milk or juice, contaminated fresh produce.	Throughout course of infection; carrier state may occur with excretion months to >1 year.	Isolation of organism of same serotype from clinical specimens from two or more ill person OR isolation of organism from epidemiologically implicated food. Enteric Transport Kit. (Stool in preservative, refrigerated, must be received at SLD within 48 hours. of collection)
Salmonella typhi	3-60 days; usually 7-14 days	Gradual onset of fever, headache, malaise, anorexia, abdominal pain. May have rose-colored spots on trunk, hepato-splenomegaly.	4-7 days	Food or water contaminated by feces or urine of infected patients or chronic carriers.	As long as organism is in excreta (i.e., stool or urine); 2-5% of infected persons become permanent gallbladder carriers.	Isolation of organism from clinical specimens from two or more ill persons OR isolation of organism from epidemiologically implicated food. Enteric Transport Kit (stool in preservative, refrigerated; must be received at SLD within 48 hours of collection)
Shigella spp.	12 hrs-6 days; usually 2-4 days	Diarrhea (sometimes bloody), often accompanied by fever and abdominal cramps	4-7 days	Food or water contaminated by feces of infected persons. (Majority of cases are person-to person spread).	During acute phase of illness, and usually less than 4 weeks	Isolation of organism of same species or serotype from clinical specimens from two or more ill persons OR isolation of organism from epidemiologically implicated food. Enteric Transport Kit (stool in preservative, refrigerated; must be received at SLD within 48 hours of collection).
Staphylococcus aureus	30 min-8 hrs.; usually 2-4 hrs.	Vomiting, diarrhea	24-48 hours	Unrefrigerated or improperly refrigerated foods.	Not communicable (preformed enterotoxin)	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 105 organisms/g from epidemiologically implicated food, provided specimen is properly handled. Enteric Transport Kit (stool or emesis in preservative, refrigerated; must be received at SLD within 48 hours of collection).

Agent	Usual Incubation Period (Range)[2,3,4]	Signs and Symptoms[2,3,4]	Duration[2,3]	Associated foods[2]	Period of Communicability[2,3]	CDC criteria for outbreak confirmation[5] **SLD Test Kit** **See SLD Biological Sciences Bureau directory of services for up to date information https://nmhealth.org/about/sld/**
Vibrio cholerae, O1 or O139	1-5 days	Profuse watery diarrhea and vomiting.	3-7 days	Fish, shellfish, water or food contaminated by infected persons.	Usually a few days after recovery, except carrier state.	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.
Vibrio parahaemolyticus	4-30 hrs.	Watery diarrhea, abdominal cramps, nausea, vomiting.	2-5 days	Undercooked or raw fish or shellfish.	Not normally communicable from person-to-person.	Isolation of Vibrio spp. from stool of two or more ill persons OR isolation of Vibrio spp from epidemiologically implicated food, provided specimen is properly handled. Enteric Transport Kit. (Stool in preservative, refrigerated; must be received at SLD within 48 hours of collection). Contact Env. Micro section regarding food collection 383-9129
Yersinia enterocolitica and *Yersinia pseudotuberculosis*	1-10 days; usually 4-6 days	Appendicitis-like symptoms (diarrhea and vomiting, fever, and abdominal pain) occur primarily in older children and young adults. May have a scarlitiniform rash with *Y. pseudotuberculosis*.	1-3 weeks	Undercooked pork, unpasteurized milk, tofu, contaminated water. Infection has occurred in infants whose caretakers handled pig intestines.	Secondary transmission appears rare. There is fecal shedding as long as symptoms exist. Untreated cases may excrete organism for 2-3 months. Prolonged asymptomatic carriage has been reported in children and adults.	Isolation of organism from clinical specimen from two or more ill persons OR isolation of pathogenic strain of organism from epidemiologically implicated food. Enteric Transport Kit. (Stool in preservative, refrigerated; must be received at SLD within 48 hours of collection.)

Viral Agents: Table of Foodborne Illnesses and Associated Clinical Characteristics [1]

Agent	Usual Incubation Period (Range)[2,3,4]	Signs and Symptoms[2,3,4]	Duration[2,3]	Associated foods[2]	Period of Communicability[2,3]	CDC criteria for outbreak confirmation[5]
						SLD Test Kit
Norovirus (and other caliciviruses)	12-48 hrs. (median 33 hours)	Nausea, vomiting, abdominal cramps, watery diarrhea, may include myalgia and some headache. Diarrhea is more prevalent in adults and vomiting is more prevalent in children.	16-60 hours	Shellfish harvested from contaminated waters, fecally-contaminated foods, ready-to-eat foods contaminated by infected food handlers such as salads, cookies, ice, sandwiches, fruit and leafy vegetables.	Extremely contagious, precise time when infected person is no longer contagious is unknown. Shown to be shed in stool and vomitus; viral shedding averages 4 weeks after infection and peaks 2-5 days.	Detection of viral RNA in at least two bulk stool or vomitus specimens by real-time or conventional reverse transcriptase-polymerase chain reaction (RT-PCR) OR visualization of viruses (NoV) with characteristic morphology by electron microscopy in at least two or more bulk stool or vomitus specimens OR two or more stools positive by commercial enzyme immunoassay (EIA).
						Stool and/or vomitus collected in clean container (no preservative); refrigerated specimen must be tested within 14 days of collection. Do not freeze specimen. Requires pre-approval by ERD. Results reported only to ERD.
Rotavirus (Retroviridae family-Group A most common)	1-3 days	Vomiting, fever, watery diarrhea, may result in severe dehydration in young children.	4-6 days	Foods handled by infected person, or foods prepared in proximity to diapered, ill infants; contaminated water.	During acute phase and shed up to 8 days after symptoms resolve.	Demonstration of organism in stool of two or more ill persons.
						No testing done at SLD
Hepatitis A	15-50 days; median: 28 days	Diarrhea, dark urine, jaundice, fever, headache, nausea, and abdominal pain.	Variable, 2 weeks-3 months	Shellfish harvested from contaminated waters, fecally-contaminated foods, ready-to-eat foods contaminated by infected food handlers.	Maximum infectivity occurs during the 1 to 2 weeks before illness onset and diminishes by one week after onset of jaundice.	Detection of immunoglobulin M antibody to hepatitis A virus (IgM anti-HAV) in serum from two or more persons who consumed epidemiologically implicated food.
						Serologic testing available at SLD. Contact Virology/Serology (505-383-9124). Blood sample with serum separated off. Refrigerated serum must be tested within 7 days of collection. If shipment will take longer, specimen must be frozen at -20°C (-4°F) and shipped on dry ice.

Parasitic Agents: Table of Foodborne Illnesses and Associated Clinical Characteristics [1]

Agent	Usual Incubation Period (Range)[2,3,4]	Signs and Symptoms[2,3,4]	Duration[2,3]	Associated foods[2]	Period of Communicability[2,3]	CDC criteria for outbreak confirmation[5]
						SLD Test Kit
Cryptosporidium	2-28 days; median: 7 days	Diarrhea (usually watery), stomach cramps, upset stomach, slight fever.	May be remitting and relapsing over weeks to months.	Drinking water, food contaminated by infected food handlers.	Usually two weeks after recovery, but shedding can continue for up to two months.	Demonstration of oocysts in stool or in small-bowel biopsy of two or more ill persons OR demonstration of organism in epidemiologically implicated food.
						No testing done at SLD, may forward specimens to CDC. Contact General Micro 505 383-9128
Cyclospora cayetanensis	1-14 days; median: 7 days	Diarrhea (usually watery), loss of appetite, weight loss, stomach cramps, nausea, vomiting, fatigue.	May be remitting and relapsing over weeks to months.	Fresh produce, berries, lettuce, herbs.	Unknown, person-to-person transmission has not been documented.	Demonstration of the parasite by microscopy or molecular methods in stool or in intestinal aspirate or biopsy specimens from two or more ill persons OR demonstration of the parasite in epidemiologically implicated food.
						No testing done at SLD, may forward specimens to CDC. Contact General Micro 505 383-9128
Giardia lamblia	3-25 days; median: 7 days	Diarrhea, stomach cramps, gas.	Days to weeks	Any food contaminated by infected food handler, drinking water.	As long as the organism is excreted in stool. Symptomatic giardiasis in adults usually lasts from 2 weeks to 2 months.	Demonstration of the parasite in stool or small bowel biopsy specimen of two or more ill persons.
						No testing done at SLD.
Trichinella spp.	1-2 days for intestinal phase; 2-4 wks. for systemic phase	Fever, nausea, diarrhea, vomiting, weakness, myalgia, periorbital edema, high eosinophil count	May last up to 8 weeks	Infected undercooked meat – especially pork	Unknown, person-to-person transmission has not been documented	Two or more ill persons and positive serologic test or demonstration of larvae in muscle biopsy OR demonstration of larvae in epidemiologically implicated meat.
						No testing done at SLD.

Non-infectious Agents: Table of Foodborne Illnesses and Associated Clinical Characteristics [1]

Agent	Usual Incubation Period (Range)[2,3,4]	Signs and Symptoms[2,3,4]	Duration[2,3]	Associated foods[2]	Period of Communicability[2,3]	CDC criteria for outbreak confirmation[5]
						SLD Test Kit
Ciguatoxin	1-48 hrs; usually 2-8 hrs	Usually abdominal pain, nausea, vomiting, diarrhea, followed by neurologic symptoms including paresthesias.	Variable, days to months	Large reef fish (grouper, red snapper, amberjack, and barracuda).	Not communicable.	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 (e.g., snapper, grouper, or barracuda).
						No patient testing available. Collect suspect fish and contact Environmental Microbiology (505-383-9129).
Scombroid toxin (histamine)	1 min-3 hrs; usually 1 hr	Flushing, rash, burning sensation of skin, mouth and throat, dizziness, urticaria, paresthesias.	3-6 hours	Mishandled fish (bluefin, tuna, skipjack, mackerel, marlin, escolar and mahi mahi)	Not communicable.	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 (e.g., mahi-mahi or fish of order Scomboidei)
						No patient testing available. Collect suspect fish and contact Environmental Microbiology (505-383-9129).
Paralytic shellfish poisoning (also referred to as Neurotoxic Shellfish Poisoning)	30 minutes to 3 hours	Diarrhea, nausea, vomiting leading to parasthesias of mouth, lips, weakness, dysphagia, dysphonia, respiratory paralysis.	Days	Scallops, mussels, clams, cockles.	Not communicable.	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.
						No patient testing available. Collect suspect food and contact Environmental Microbiology (505-383-9129).
Puffer fish (tetrodotoxin)	10 min-3 hrs; usually 10-45 min	Parasthesias, vomiting, diarrhea, abdominal pain, ascending	Death, usually in 4-6 hours	Puffer fish.	Not communicable.	Demonstration of tetrodotoxin in epidemiologically implicated fish OR clinical syndrome among persons who have eaten puffer fish
						No patient testing available. Collect suspect food and contact Environmental Microbiology (505-383-9129).

Agent	Usual Incubation Period (Range)[2,3,4]	Signs and Symptoms[2,3,4]	Duration[2,3]	Associated foods[2]	Period of Communicability[2,3]	CDC criteria for outbreak confirmation[5]
						SLD Test Kit
		paralysis, respiratory failure.				
Heavy metals (antimony, cadmium, copper, iron, tin, zinc)	5 min-8 hrs; usually <1 hr	Vomiting, nausea, often metallic taste	Usually self-limited	Acidic foods or beverages prepared stored or cooked in containers coated, lines or contaminated with metal.,	Not communicable.	Demonstration of high concentration of metal in epidemiologically implicated food.
						No patient testing available. Collect suspect food or metal container and contact Environmental Microbiology (505-383-9129).
Mushroom toxins, shorter-acting (muscimol, muscarine, psilocybin, coprinus artrementaris, ibotenic acid	2 hours	Vomiting, diarrhea, confusion, visual disturbance, salivation, diaphoresis, hallucinations, disulfiram-like reaction.	Self-limited	Wild mushrooms	Not communicable.	Clinical syndrome among persons who have eaten mushroom identified as toxic type OR demonstration of toxin in epidemiologically implicated mushroom or food containing mushroom.
						No patient testing available. Collect suspect food and contact Environmental Microbiology (505-383-9129) .
Mushroom toxins, longer-acting (amanitin)	6-24 hrs	Diarrhea, abdominal cramps, leading to hepatic and renal failure	Often fatal	Mushrooms	Not communicable.	Clinical syndrome among persons who have eaten mushroom identified as toxic type OR demonstration of toxin in epidemiologically implicated mushroom or food containing mushrooms.
						No patient testing available. Collect suspect food and contact Environmental Microbiology (505-383-9129) .

https://www.cdc.gov/foodsafety/outbreaks/investigating-outbreaks/confirming_diagnosis.html

- This table is based on a similar table developed by the Acute and Communicable Disease Prevention Program of the Oregon Department of Human Services. Available at http://public.health.oregon.gov/diseasesconditions/communicabledisease/reportingcommunicabledisease/reportingguidelines/documents/compend.pdf. Accessed November 23, 2012.
- CDC. Diagnosis and management of foodborne illness: a primer for physicians and other healthcare providers. MMWR. 2004;53(RR4):1-33. Produced collaboratively by the American Medical Association; American Nurses Association - American Nurses Foundation; Centers for Disease Control and Prevention, Center for Food Safety and Applied Nutrition, Food and Drug Administration; Food Safety and Inspection Service, US Department of Agriculture. Available at http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5304a1.htm. Accessed November 23, 2012.
- Heymann DL, ed. Control of Communicable Diseases Manual, 19th ed. Washington, DC: American Public Health Association; 2008.
- Kimberlin DW, ed. Red Book: 2003 Report of the Committee on Infectious Diseases, 30th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2015.CDC. Guide to confirming a diagnosis in foodborne disease. Available at http://www.cdc.gov/outbreaknet/investigations/investigating.html . Accessed November 23, 2012.
- CDC. "Updated Norovirus Outbreak Management and Disease Prevention Guidelines". Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6003a1.htm?s_cid=rr6003a1_w Accessed December 3, 2012.
- SLD Directory of Services available at http://sld.state.nm.us/documents/SLD-BSB-DirectoryOfServices-2012.pdf Accessed December 3, 2012.