

Pathogen/Poison/Toxin	Symptom onset	Symptoms (by frequency)	Implicated foods or common vehicles	Habitat/Reservoir	Specimen source	Minimum amount	Laboratory/Diagnostic tests	Storage & transport instruction
Upper Gastrointestinal Symptoms (nausea, vomiting)								
Metallic salts & heavy metals e.g. copper, zinc, tin, cadmium	< 1h	N, V, altered taste sensation	Lemonade, punch, wine, gelatin dessert containing fruit, beer, carbonated drinks	Metallic containers	Blood, ¹ urine, ¹ vomitus, ¹ food ^{2,B}	1 ml blood in purple top test tube	Metal levels ^A	Call environmental epidemiologist at (512) 776-7269
Nitrites	1-2h	N, V, cyanosis, HA, dizziness, dyspnea, trembling, weakness, fainting	Spinach & other row crops kept moist at room temperature	Nitrification of fields where plants are grown prior to harvest	Food ^{2,B}		Nitrite level ^A	Call environmental epidemiologist at (512) 776-7269
<i>Staphylococcus aureus</i> heat stable enterotoxin	0.5-8h usual 2-4h	N, V, D, P, prostration	Meat, seafood, pasta, or salads & sandwich spreads made with eggs or mayonnaise	Nose, throat, skin, food stored at >40° F	Stool, ^{1,2,D} food, ^{2,B} wound, ^{1,2} vomitus, ^{1,2} throat swab, ^{1,2}	100g food (4oz) ^{2,B}	Culture, ^{1,2} (PFGE if pre-approved by DSHS); ² toxin assay, ² colony count ^{1,2}	Call infectious disease epidemiologist at (512) 776-7676. Ship food ^{2,B} overnight on wet ice at 2-8° C (35-46° F); do not freeze specimen ; fully saturate swab for stool, wound, & throat specimen; place in Cary-Blair medium
<i>Bacillus cereus</i> heat stable emetic toxin	1-5h usual 2-4h	N, V	Starchy food, rice, salads, custards, cereals, pudding, soups	Soil, dust, spices, food stored at >40° F; spore survives heat	Food ^{2,B}	100g food (4oz) ^{2,B}	Colony count, ² identification ²	Call infectious disease epidemiologist at (512) 776-7676. Ship food ^{2,B} overnight on wet ice at 2-8° C (35-46° F); do not freeze specimen
<i>Streptococcus pyogenes</i>	12-72h	Sore throat, F, N, V, runny nose, rash	Milk, deviled eggs or salads & sandwich spreads made with eggs or mayonnaise	Nose, throat, skin	Food, ^{2,B} stool, ¹ throat swab, ¹ wound swab ¹	100g food (4oz) ^{2,B}	Culture, ^{1,2} identification ^{1,2}	Call infectious disease epidemiologist at (512) 776-7676. Ship food ^{2,B} overnight on wet ice at 2-8° C (35-46° F); do not freeze specimen ; fully saturate swab for stool, wound, and throat specimen; place in Stuarts or Aimes medium
Lower Gastrointestinal Symptoms (diarrhea, abdominal cramps/pains)								
<i>Vibrio cholerae</i> O1, O139, & <i>Vibrio non-O1</i>	hrs-5d usual 2-3d	Watery diarrhea (or rice water stools), C, N, V	Food & water contaminated with feces or vomitus, raw or improperly cooked seafood	Shellfish, copepods, or other zooplankton in brackish waters or estuaries	Stool, ^{2,D} rectal swab, ^{2,D} food, ^{2,B} shellfish, ^{2,B} serum, ^{1,E}	100g food, ^{2,B} 150g shellfish, ^{2,B} 15 unshucked oysters ^{2,B}	Culture, ² identification, ² typing, ² toxin testing, ² paired sera for <i>Vibrio</i> antibodies	Call infectious disease epidemiologist at (512) 776-7676. Ship food ^{2,B} overnight on wet ice at 2-8° C (35-46° F); do not freeze specimen ; stool or fully saturated rectal swab transported in Cary-Blair medium
<i>Vibrio parahaemolyticus</i>	4-30h usual 12-24h	D, C, HA, V, F, infected wound, sepsis	Raw and undercooked seafood	Salt water shellfish; food stored at >40° F	Stool, ^{2,D} shellfish ^{2,B}	150g food, ^{2,B} 15 unshucked oysters ^{2,B}	Culture, ² identification, ² multiple tube fermentation	Call infectious disease epidemiologist at (512) 776-7676. Stool transported in Cary-Blair medium; ship food ^{2,B} overnight on wet ice at 2-8° C (35-46° F); do not freeze specimen
<i>Bacillus cereus</i> heat labile diarrheal toxin	6-24h	D, C, and sometimes N, V	Starchy food, rice, salads, custards, cereals, pudding, soups	Soil, dust, spices, food stored at >40° F; spore survives heat	Food, ^{2,B} stool ^{2,D}	100g food (4oz) ^{2,B}	Culture, ² identification, ² colony count ²	Call infectious disease epidemiologist at (512) 776-7676. Ship food ^{2,B} overnight on wet ice at 2-8° C (35-46° F); do not freeze specimen
<i>Clostridium perfringens</i> heat stable spore	6-24h usual 10-12h	C, D, N	Meat & poultry dishes, sauces, gravies	Dust, soil, human, and animal GI tracts, food stored at >40° F; prefers low oxygen	Stool, ^{2,D} food ^{2,B}	100g food (4oz) ^{2,B}	Culture, ² identification, ² colony count ² multiple tube	Call infectious disease epidemiologist at (512) 776-7676. Ship food ^{2,B} and stool overnight on wet ice at 2-8° C (35-46° F); do not freeze specimen
<i>Salmonella</i> all serotypes	6-72h usual 12-36h	D, C, F, N, HA, V	High protein foods: meat, poultry, fish, eggs	Human & animal intestinal tracts; food stored at >40° F	Stool, ^{2,D} food, ^{2,B} blood ²	100g food (4oz) ^{2,B}	Culture, ² serotyping, ² identification, ² PFGE ²	Call infectious disease epidemiologist at (512) 776-7676. Stool transported in Cary-Blair medium; ship food ^{2,B} overnight on wet ice at 2-8° C (35-46° F); do not freeze specimen
Enteric viruses: Norwalk-like viruses	10-50h usual 1-2d	N, V, F, P, D, HA	Shellfish, salads, clams, oysters, food handled by infected person	Humans	Fresh stool ^{2,D}	1-10g stool in sterile plastic container ^{2,D}	PCR (testing for outbreak investigations only)	Call infectious disease epidemiologist at (512) 776-7676. Collect specimen in sterile plastic container, keep cold at 2-8° C (35-46° F), and ship to lab immediately
<i>Escherichia coli</i> , Shiga toxin-producing	1-8d	D, (possibly bloody) C, N, hemolytic uremic syndrome	Meats, cheeses, fecally contaminated foods, unpasteurized milk and cheeses	Human & animal (cattle) feces; can grow at refrigeration temperatures	Stool, ^{2,D} food ^{2,B}	100g food (4oz) ^{2,B}	Culture, ² identification, ² toxin detection, ² PFGE ²	Call infectious disease epidemiologist at (512) 776-7676. Stool transported in Cary-Blair medium; ship food ^{2,B} overnight on wet ice at 2-8° C (35-46° F); do not freeze specimen
<i>Shigella</i> species	1-7d usual 1-3d	D, C, F, N, V	Moist mixed foods, salads, milk, beans, food handled by infected person	Humans	Stool, ^{2,D} food ^{2,B} blood ¹	100g food (4oz) ^{2,B}	Culture, ^{1,2} PFGE, ² identification, ² grouping ²	Call infectious disease epidemiologist at (512) 776-7676. Stool transported in Cary-Blair medium; ship food ^{2,B} overnight on wet ice at 2-8° C (35-46° F); do not freeze specimen
<i>Yersinia enterocolitica</i> or <i>Y. pseudotuberculosis</i>	3-7d usual 4-6d	D, F, P, N, V, mimics appendicitis	Pork, milk, tofu, poultry, beef	Pigs, cattle, poultry; grows at 35-40° F; sensitive to heat at 122° F	Stool, ^{2,D} blood, ^{1,2} tissue ^{1,2}	100g food (4oz) ^{2,B}	Culture, ^{1,2} identification ^{1,2}	Call infectious disease epidemiologist at (512) 776-7676. Saturate swab with stool and place in Cary-Blair or CIN culture medium; ship food ^{2,B} overnight on wet ice at 2-8° C (35-46° F); do not freeze specimen
<i>Cyclospora</i> species	1-11d usual 7d	D, C, fatigue, N, weight loss; can be shed in stool for more than 28d	Fecally contaminated water, food, and raw produce	Humans	Stool ^{1,2,D}	Use O & P kit ^D	Acid fast stain exam, ² O & P exam ^{1,2}	Call infectious disease epidemiologist at (512) 776-7676. Stool transported in PVA & formalin (O & P kit) ^D
<i>Campylobacter jejuni</i>	1-10d usual 3-5d	D, C, N, F, HA, malaise, bloody D	Meat, poultry, milk, mushrooms; food stored at >86° F	Foods of animal origin	Stool, ^{1,2,D} food, ^{2,B} rectal swab, ^{1,2,D}	100g food (4oz) ^{2,B}	Culture, ^{1,2} identification ^{1,2}	Call infectious disease epidemiologist at (512) 776-7676. Stool transported in Cary-Blair medium; ship food ^{2,B} overnight on wet ice at 2-8° C (35-46° F); do not freeze specimen
<i>Cryptosporidium parvum</i> or <i>C. hominis</i>	1-12d usual 7d	D, C, N, F, fatigue, HA, V	Food handled by infected person, fecally contaminated water	Humans, cattle, other domestic animals	Stool ^{1,2,D}	Use O & P kit ^D	Acid fast stain exam, ^{1,2} O & P exam ^{1,2}	Call infectious disease epidemiologist at (512) 776-7676. Stool transported in PVA & formalin (O & P kit) ^D
<i>Giardia lamblia</i>	3-25d usual 7-10d	D, mucoid fatty stools, gas, C, fatigue, N; shed for months in stool	Food handled by infected person; fecally contaminated water	Humans and other animals	Stool ^{1,2,D}	Use O & P kit ^D	O & P exam ^{1,2}	Call infectious disease epidemiologist at (512) 776-7676. Stool transported in PVA & formalin (O & P kit) ^D
<i>Entamoeba histolytica</i>	1-8w usual 2-4w	Mucoid or bloody D, F, chills, C	Food handled by infected person; fecally contaminated water	Humans	Stool ^{1,2,D}	Use O & P kit ^D	O & P exam ^{1,2}	Call infectious disease epidemiologist at (512) 776-7676. Stool collected and placed in PVA & formalin (O & P kit) ^D
<i>Taenia saginata</i> & <i>T. solium</i>	3-6m	Nervousness, insomnia, P, anorexia, weight loss	Raw or undercooked beef (<i>T. saginata</i>) or pork (<i>T. solium</i>) products	Intermediate host cattle (<i>T. saginata</i>) or pigs (<i>T. solium</i>); human definitive host	Stool ^{1,2,D}	Use O & P kit ^D	Identification of eggs and parasite segments in stool ^{1,2}	Call zoonotic disease epidemiologist at (512) 776-7676. Stool transported in PVA & formalin (O & P kit) ^D
Neurological and/or Gastrointestinal (visual disturbances, vertigo, tingling, paralysis)								
Shellfish toxin	0.5-3h usual <1h	Paresthesias, reversal of hot-cold sensation, muscle aches, D, V	Shellfish (molluscs)	Shellfish (molluscs)	Shellfish, ^{2,C} urine, ¹ blood ¹	200-250g shellfish or 15 unshucked shellfish ^{2,C}	Toxin assay ^C	Call infectious disease epidemiologist at (512) 776-7676. Refrigerate food ^{2,C} specimen at 2-8° C (35-46° F) or freeze
Organophosphate (pesticide)	<1h	N, V, C, D, HA, nervousness, blurred vision, chest pain, cyanosis, confusion, twitching, convulsions	Contaminated foods	Plants sprayed with pesticides or kept in same area with pesticides	Food, ^{2,B} whole blood ¹		Chemical analysis, ² red cell cholinesterase activity ¹	Call environmental epidemiologist at (512) 776-7269.
Ciguatera toxin	1-48h usual 1-6h	Tingling, numbness, dry mouth, pupil dilation, blurred vision, paralysis	Large predatory reef fish: barracuda, snapper, amberjack, grouper	Large predatory reef fish	Fish, ^{2,B} mollusks ^{2,B}			Call infectious disease epidemiologist at (512) 776-7676.
<i>Clostridium botulinum</i> neurotoxins	2h-6d usual 12-36h	Blurred vision, muscle weakness, cranial nerve palsies, descending paralysis, mental status changes, respiratory distress, possible death. In infants, "floppy baby syndrome."	Home-canned foods, alkaline foods, lightly cured refrigerated foods, smoked fish. In infants: honey, molasses, and syrups.	Soil, plants, marine sediments, fish	Food, ^{2,B} stool, ^{2,D} vomitus, ² gastric aspirate, ² serum ^{1,2}	100g food, ^{2,B} 10 ml blood, ² or 5ml serum ²	Culture, ² toxin assay, ² toxin typing ²	Call both infectious disease epidemiologist at (512) 776-7676 AND Lab at (512) 776-7185. Collect suspect food specimens, keep at 2-8° C (35-46° F), ship food ^{2,B} overnight on wet ice; do not freeze specimen . Hold all other suspect canned foods until testing is completed, then dispose of properly.
Organic mercury, lead, arsenic	>72h	Numbness, leg weakness, spastic paralysis, impaired vision, blindness, coma	Crab, shellfish, fish, other marine invertebrates	Crab, shellfish, fish, other marine invertebrates	Urine		Chemical analysis	Call environmental epidemiologist at (512) 776-7269.
<i>Listeria monocytogenes</i>	varies 3-70d usual 3w	Flu-like illness (F, chills, muscle aches, N, and/or D), meningitis, neonatal sepsis, cerebritis	Milk, meats, soft cheeses, manure fertilized vegetables	Soil, plants, water, food stored at 30-40° F	Food, ^{2,B} stool, ^{2,D} blood, ¹ CSF, ¹ tissue biopsy ¹	100g food, ^{2,B} 5g stool, ^{2,D} 0.5ml serum, 10ml CSF	Culture, ^{1,2} identification, ^{1,2} PFGE ²	Call infectious disease epidemiologist at (512) 776-7676. Unpreserved stool in Cary-Blair ² isolates shipped on nonglucose slants such as trypticase soy or heart infusion agar; all specimens kept at 2-8° C (35-46° F)
<i>Taenia solium</i> Cysticerci(us)	>2m	HA, N, V, seizures	Exposure to human stool or food contaminated with tapeworm eggs	Humans, pigs	E, Serum, CSF ¹	10ml blood, 5ml serum, or 1 ml CSF	MRI or CT detection of cysticerci (cysts) in the brain, ¹ serological assay ^{1,2}	Call zoonotic disease epidemiologist at (512) 776-7676. Red top test tube for serum; separate from RBCs and ship cold
Allergic (facial flushing, itching)								
Scombroid Histamine	<1-3h usual <1h	HA, N, V, P, flushing, itching, peppery taste	Tuna, mackerel, skipjack, bonito, mahi mahi, blue fish	Partially decomposed fish	Fish ^{2,B}		Identification of decomposed fish	Call infectious disease epidemiologist at (512) 776-7676
Generalized Infection (fever, chills, malaise, prostration, aches, swollen lymph nodes)								
<i>Salmonella</i> Typhi	3d-3m usual 1-3w	F, HA, malaise, N, P, rose spots	Food and water contaminated with feces, raw or improperly cooked seafood	Human intestinal tracts; food stored at >40° F	Stool, ² food, ^{2,B} blood ¹	100g food (4oz) ^{2,B}	Culture, ¹ serotyping ²	Call zoonotic disease epidemiologist at (512) 776-7676. Collect a stool specimen from the case-patient and ship to the laboratory in buffered glycerol saline solution or Cary-Blair transport medium; do not freeze specimen ; collect blood specimen in red top test tube.
<i>Brucella</i> species	5-60d usual 1-2m	F, myalgia, malaise, HA, arthralgia	Raw milk, products from sheep, cows, goats.	Cattle, swine, sheep, goats, deer, kennel dogs, coyotes	Stool, ¹ food, ^{2,B} blood, ¹ gastric washing ¹ Serum ^F	2ml serum in red top test tube, 100g food (4oz) ^{2,B}	Culture, ¹ identification, ¹ single and paired SAT ^{1,2}	Call zoonotic disease epidemiologist at (512) 776-7676. Ship food ^{2,B} overnight on wet ice at 2-8° C (35-46° F); do not freeze specimen ; collect blood specimen in red top test tube.
<i>Trichinella spiralis</i>	5-45 d	Periorbital edema, gastroenteritis, F, labored breathing	Raw or undercooked meats containing encysted larvae	Swine, dogs, cats, horses, rats, many wild animals	Serum, tissue, biopsy, food (meat) ^{2,B}	3 ml serum ¹ , 100 g food ^{2,B}	Squash prep	Call zoonotic disease epidemiologist at (512) 776-7676 AND DSHS Lab at (512) 776-7560 prior to shipping specimen. Call infectious disease epidemiologist at (512) 776-7676.
<i>Toxoplasma gondii</i>	10-23d	F, HA, myalgia, rash	Contaminated foods	Cats, rats, birds, feces, dirt	Blood, ^{1,2} tissue biopsy, ^{1,2} Serum ^E	2ml serum in red top test tube, 100g food (4oz) ^{2,B}	Single serum EIA (IgM), ¹ paired sera IFA (IgG), ¹ giemsa stain of tissue ¹	Call zoonotic disease epidemiologist at (512) 776-7676. Collect blood specimen in red top test tube.
Hepatitis A	15-50d usual 30d	F, malaise, N, C, anorexia, later dark urine, jaundice	Foods handled by infected person	Transmitted by fecal/oral route, person to person, shed in human stool	Serum ^{1,2} unhemolyzed and not lipemic	2ml serum in red top test tube	Total IgG, ^{1,2} single serum IgM anti-HAV ^{1,2,E}	Call infectious disease epidemiologist at (512) 776-7676; specimens only accepted during outbreaks. Collect blood specimen in red top test tube, ship at 2-8° C (35-46° F).

Abbreviations
h=hour
d=day
w=week
m=month
C=abdominal cramps
D=diarrhea
F=fever
GI=gastrointestinal
HA=headache
N=nausea
P=abdominal pain
V=vomiting
° C=degrees Centigrade
° F=degrees Fahrenheit
CSF=cerebrospinal fluid
EIA=enzyme immunoassay
IFA=indirect fluorescent antibody test
PFGE=pulse-field gel electrophoresis
SAT=serum agglutination test
PCR=polymerase chain reaction
O & P=ova and parasite

Footnotes
¹ Initial diagnostic test done at local hospital, clinic, commercial, or nearest health department laboratory.
² Call the Texas Department of State Health Services (DSHS) Laboratory at (512) 458-7598 for submission, collection (<3d old food), and handling instructions; ship food **overnight** on wet ice at 2-8° C (35-46° F); do not freeze specimen; food only accepted from public health officials.
^A Initial (diagnostic) specimens should be routed to the local hospital laboratory and remaining or reference specimens to the Texas Department of State Health Services (DSHS) laboratory. DSHS forwards certain specimens for testing to federal laboratories and results may not be available for weeks or months.
^B Food specimens for bacteriological analysis: collect a minimum of 100g (4 oz) and a maximum of 450g (1 lb) for each specimen, store and ship in a sterile Whirl Pak bag or sterile plastic containers at 0-4° C (32-39° F). Frozen foods should remain frozen. Send specimens to laboratory as soon as the specific food is suspected as a vehicle of transmission. Shellfish specimens need to be refrigerated at 0-4° C (32-39° F) and tested within 24h after collection. Alert the laboratory of need to test food specimen and ask for further shipping instructions. Approximate conversions for food measures: 100g=4 ounces; 5ml=one teaspoon; 2ml=20-30 drops
^C Oyster specimens for brevetoxin assay need to be shucked, drained and placed in 1 quart mason jars and then frozen for transport to the lab. Two hundred to 250 grams of meat are needed for the assay.
^D Stool specimen analyses require prior approval at (512) 458-7318; shipping containers can be obtained by calling (512) 458-7661; specimens for bacteriological culturing are collected in a Cary-Blair CultureSwab Transport System (in some cases an unpreserved fresh specimen is needed); stool specimens for intestinal parasites require division of the specimen into two portions: one portion is placed into a vial of formaldehyde, the other in a vial of polyvinyl alcohol (O & P kit); the fully saturated rectal swab may be shipped without a preservative, in a glycerol saline solution, or inoculated into a specific transport medium depending on the test. Samples may be refrigerated.
^E Separated serum may be shipped overnight cold (2-8° C), on wet ice packs, if it will be received at DSHS within 48 hr of collection. Frozen (< -20° C) separated serum must be shipped on dry ice if it will be received more than 48 hr from time of collection.

Primary Container
Culture
Absorbent Packing Material
Cap
Secondary Container
Shipping Container
Address Label

Packaging and Labeling of Samples

Cross Section of Proper Packing
Waterproof Tape
Culture
Absorbent Packing Material

General Shipping Instructions

Pure isolates that meet the requirements for Category A infectious substances require a 6.2 Infectious Substance sticker on the outermost container. Pure isolates that do not meet the requirements for Category A infectious substances should be labeled with the UN3373 Biological Substance sticker.

For additional information call (512) 776-7569.