



Complete Summary

GUIDELINE TITLE

Diagnosis and management of foodborne illnesses: a primer for physicians and other health care professionals.

BIBLIOGRAPHIC SOURCE(S)

American Medical Association, American Nurses Association, American Nurses Foundation, Centers for Disease Control and Prevention, Center for Food Safety and Applied Nutrition, U.S. Food and Drug Administration, Food Safety and Inspection Service, U.S. Department of Agriculture. Diagnosis and management of foodborne illnesses: a primer for physicians and other health care professionals. MMWR Recomm Rep 2004 Apr 16;53(RR-4):1-33. [PubMed](#)

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Diagnosis and management of foodborne illnesses: a primer for physicians. MMWR Recomm Rep 2001 Jan 26;50 (RR-2):1-69.

** REGULATORY ALERT **

FDA WARNING/REGULATORY ALERT

Note from the National Guideline Clearinghouse (NGC): This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- [July 08, 2008, Fluoroquinolones \(ciprofloxacin, norfloxacin, ofloxacin, levofloxacin, moxifloxacin, gemifloxacin\)](#): A BOXED WARNING and Medication Guide are to be added to the prescribing information to strengthen existing warnings about the increased risk of developing tendinitis and tendon rupture in patients taking fluoroquinolones for systemic use.

COMPLETE SUMMARY CONTENT

** REGULATORY ALERT **

SCOPE

METHODOLOGY - including Rating Scheme and Cost Analysis

RECOMMENDATIONS

EVIDENCE SUPPORTING THE RECOMMENDATIONS

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

QUALIFYING STATEMENTS

SCOPE

DISEASE/CONDITION(S)

Foodborne illnesses ("foodborne illnesses" include any illness that is related to food ingestion; gastrointestinal tract symptoms are the most common clinical manifestations of foodborne illnesses).

GUIDELINE CATEGORY

Diagnosis
Evaluation
Management
Treatment

CLINICAL SPECIALTY

Emergency Medicine
Family Practice
Infectious Diseases
Internal Medicine
Pediatrics
Preventive Medicine

INTENDED USERS

Physicians

GUIDELINE OBJECTIVE(S)

To help physicians and other health professionals in the prevention and control of food-related disease outbreaks by providing practical and concise information on the diagnosis, treatment, and reporting of foodborne illnesses

TARGET POPULATION

Infants, children, adolescents and adults

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis

1. Differential diagnosis:
 - Evaluation for signs and symptoms

- Differentiation between foodborn illness and viral syndromes
 - Duration
 - Associated foods
 - Evaluation for underlying medical conditions (e.g., irritable bowel syndrome, inflammatory bowel disease, Crohn's disease)
2. Microbiology testing:
- Stool cultures
 - Blood cultures
 - Direct antigen detection tests and molecular biology techniques

Treatment

1. Supportive care
2. Oral and/or intravenous hydration, with fluid +/- electrolyte replacement
3. Gastric lavage
4. Pharmacotherapy (penicillin, ciprofloxacin, erythromycin, trimethoprim-sulfamethoxazole, ampicillin, gentamicin, rifampin, doxycycline, ceftazidime, tetracycline, quinolones, bismuth sulfate, metronidazole, iodoquinol, paromomycin, spiramycin, pyrimethamine, nitazoxanide, mebendazole, albendazole, sulfadiazine, methylene blue, atropine, pralidoxime, antihistamines, corticosteroids, nalidixic acid, intravenous mannitol)
5. Botulinum antitoxin and botulism immune globulin

Surveillance and Reporting

1. Report potential foodborne illness
2. Contact local or state health department with specific notifiable disease
3. Report increases in unusual illnesses, symptom complexes, or disease complexes to public health authorities
4. Follow the most current information on food safety

MAJOR OUTCOMES CONSIDERED

Disease outbreaks

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Not stated

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Not stated

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

METHODS USED TO ANALYZE THE EVIDENCE

Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Not stated

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Diagnosing Foodborne Illnesses

Differential Diagnosis

The presentation of a patient with a foodborne illness is often only slightly different from that of a patient who presents with a viral syndrome. In addition, viral syndromes are so common that it is reasonable to assume that a percentage

of those diagnosed with a viral syndrome have actually contracted a foodborne illness. Therefore, the viral syndrome must be excluded in order to suspect the foodborne illness and take appropriate public health action. Fever, diarrhea, and abdominal cramps can be present or absent in both cases so they are not very helpful. The absence of myalgias or arthralgias would make a viral syndrome less likely and a foodborne illness (that does not target the neurologic system) more likely. Foodborne illnesses that do target the neurologic system tend to cause paraesthesias, weakness and paralysis that are distinguishable from myalgias or arthralgias (see below). The presence of dysentery (bloody diarrhea) is also more indicative of a foodborne illness, particularly if it is early in the course.

If any of the following signs and symptoms occur, alone or in combination, laboratory testing may provide important diagnostic clues (particular attention should be given to very young and elderly patients and to immunocompromised patients, all of whom are more vulnerable):

- Bloody diarrhea;
- Weight loss;
- Diarrhea leading to dehydration;
- Fever;
- Prolonged diarrhea (3 or more unformed stools per day, persisting several days);
- Neurologic involvement such as paresthesias, motor weakness, cranial nerve palsies;
- Sudden onset of nausea, vomiting, diarrhea;
- Severe abdominal pain.

In addition to foodborne causes, a differential diagnosis of gastrointestinal tract disease should include underlying medical conditions such as irritable bowel syndrome; inflammatory bowel diseases such as Crohn's disease or ulcerative colitis; malignancy; medication use (including antibiotic-related *Clostridium difficile* toxin colitis); gastrointestinal tract surgery or radiation; malabsorption syndromes; immune deficiencies; and numerous other structural, functional, and metabolic etiologies. Consideration also should be given to exogenous factors such as the association of the illness with travel, occupation, emotional stress, sexual practices, exposure to other ill persons, recent hospitalization, child care center attendance, and nursing home residence.

The table below presents a list of etiologic agents to consider for various manifestations of foodborne illnesses.

Clinical Presentation	Potential Food-Related Agents to Consider
Gastroenteritis (vomiting as primary symptom; fever and/or diarrhea also may be present)	Viral gastroenteritis, most commonly rotavirus in an infant or norovirus and other caliciviruses in an older child or adult; or food poisoning due to preformed toxins (e.g., vomitoxin, <i>Staphylococcus aureus</i> toxin, <i>Bacillus cereus</i> toxin) and heavy metals.

Clinical Presentation	Potential Food-Related Agents to Consider
<p>Noninflammatory diarrhea (acute watery diarrhea without fever/dysentery; some cases may present with fever)*</p>	<p>Can be caused by virtually all enteric pathogens (bacterial, viral, parasitic) but is a classic symptom of:</p> <ul style="list-style-type: none"> • Enterotoxigenic <i>Escherichia coli</i> • <i>Giardia</i> • <i>Vibrio cholerae</i> • Enteric viruses (astroviruses, noroviruses and other caliciviruses, enteric adenovirus, rotavirus) • <i>Cryptosporidium</i> • <i>Cyclospora cayetanensis</i>
<p>Inflammatory diarrhea (invasive gastroenteritis; grossly bloody stool and fever may be present)**</p>	<ul style="list-style-type: none"> • <i>Shigella</i> species • <i>Campylobacter</i> species • <i>Salmonella</i> species • Enteroinvasive <i>Escherichia coli</i> • Enterohemorrhagic <i>Escherichia coli</i> • <i>Escherichia coli</i> O157:H7 • <i>Vibrio parahaemolyticus</i> • <i>Yersinia enterocolitica</i> • <i>Entamoeba histolytica</i>
<p>Persistent diarrhea (lasting ≥ 14 days)</p>	<p>Prolonged illness should prompt examination for parasites, particularly in travelers to mountainous or other areas where untreated water is consumed. Consider <i>Cyclospora cayetanensis</i>, <i>Cryptosporidium</i>, <i>Entamoeba histolytica</i>, and <i>Giardia lamblia</i>.</p>
<p>Neurologic manifestations (e.g., paresthesias, respiratory depression, bronchospasm, cranial nerve palsies)</p>	<ul style="list-style-type: none"> • Botulism (<i>Clostridium botulinum</i> toxin) • Organophosphate pesticides • Thallium poisoning • Scombroid fish poisoning (histamine, saurine) • Ciguatera fish poisoning (ciguatoxin) • Tetrodon fish poisoning (tetrodotoxin) • Neurotoxic shellfish poisoning (brevetoxin) • Paralytic shellfish poisoning (saxitoxin) • Amnesic shellfish poisoning (domoic acid) • Mushroom poisoning • Guillain-Barré Syndrome (associated with infectious diarrhea due to <i>Campylobacter jejuni</i>)

Clinical Presentation	Potential Food-Related Agents to Consider
Systemic illness (e.g., fever, weakness, arthritis, jaundice)	<ul style="list-style-type: none"> • <i>Listeria monocytogenes</i> • <i>Brucella</i> species • <i>Trichinella spiralis</i> • <i>Toxoplasma gondii</i> • <i>Vibrio vulnificus</i> • Hepatitis A and E viruses • <i>Salmonella</i> Typhi and <i>Salmonella</i> Paratyphi • Amebic liver abscess

* Noninflammatory diarrhea is characterized by mucosal hypersecretion or decreased absorption without mucosal destruction and generally involves the small intestine. Some affected patients may be dehydrated because of severe watery diarrhea and may appear seriously ill. This is more common in the young and the elderly. Most patients experience minimal dehydration and appear mildly ill with scant physical findings. Illness typically occurs with abrupt onset and brief duration. Fever and systemic symptoms usually are absent (except for symptoms related directly to intestinal fluid loss).

** Inflammatory diarrhea is characterized by mucosal invasion with resulting inflammation and is caused by invasive or cytotoxigenic microbial pathogens. The diarrheal illness usually involves the large intestine and may be associated with fever, abdominal pain and tenderness, headache, nausea, vomiting, malaise, and myalgia. Stools may be bloody and may contain many fecal leukocytes.

Clinical Microbiology Testing

Stool cultures are indicated if the patient is immunocompromised, febrile, has bloody diarrhea, has severe abdominal pain, or if the illness is clinically severe or persistent. Stool cultures are also recommended if many fecal leukocytes are present. This indicates diffuse colonic inflammation and is suggestive of invasive bacterial pathogens such as *Shigella*, *Salmonella*, and *Campylobacter* species, and invasive *Escherichia coli*. In most laboratories, routine stool cultures are limited to screening for *Salmonella* and *Shigella* species, and *Campylobacter jejuni/coli*. Cultures for *Vibrio* and *Yersinia* species, *Escherichia coli* O157:H7, and *Campylobacter* species other than *jejuni/coli* require additional media or incubation conditions and therefore require advance notification or communication with laboratory and infectious disease personnel.

Stool examination for parasites generally is indicated for patients with suggestive travel histories, who are immunocompromised, who suffer chronic or persistent diarrhea, or when the diarrheal illness is unresponsive to appropriate antimicrobial therapy. Stool examination for parasites is also indicated for gastrointestinal tract illnesses that appear to have a long incubation period. Requests for ova and parasite examination of a stool specimen will often enable identification of *Giardia lamblia* and *Entamoeba histolytica*, but a special request may be needed for detection of *Cryptosporidium* and *Cyclospora cayetanensis*. Each laboratory may vary in its routine procedures for detecting parasites so it is important to contact your laboratory.

Blood cultures should be obtained when bacteremia or systemic infection are suspected.

Direct antigen detection tests and molecular biology techniques are available for rapid identification of certain bacterial, viral, and parasitic agents in clinical specimens. In some circumstances, microbiologic and chemical laboratory testing of vomitus or implicated food items also is warranted. For more information on laboratory procedures for the detection of foodborne pathogens, consult an appropriate medical specialist, clinical microbiologist, or state public health laboratory.

Treating Foodborne Illnesses

Selection of appropriate treatment depends on identification of the responsible pathogen (if possible) and determining if specific therapy is available. Many episodes of acute gastroenteritis are self-limiting and require fluid replacement and supportive care. Oral rehydration is indicated for patients who are mildly to moderately dehydrated; intravenous therapy may be required for more severe dehydration. Routine use of antidiarrheal agents is not recommended because many of these agents have potentially serious adverse effects in infants and young children. Choice of antimicrobial therapy should be based on:

- Clinical signs and symptoms;
- Organism detected in clinical specimens;
- Antimicrobial susceptibility tests; and
- Appropriateness of treating with an antibiotic (some enteric bacterial infections are best not treated).

Knowledge of the infectious agent and its antimicrobial susceptibility pattern allows the physician to initiate, change, or discontinue antimicrobial therapy. Such information also can support public health surveillance of infectious disease and antimicrobial resistance trends in the community. Antimicrobial resistance has increased for some enteric pathogens, which requires judicious use of this therapy.

Suspected cases of botulism are treated with botulinum antitoxin. Equine botulinum antitoxin for types A, B, and E can prevent the progression of neurologic dysfunction if administered early in the course of illness. Physicians and other health care professionals should notify their local and state health departments regarding suspected cases of botulism. The Centers for Disease Control and Prevention (CDC) maintains a 24-hour consultation service to assist health care professionals with the diagnosis and management of this rare disease.

The following tables summarize diagnostic features, laboratory testing and treatment for bacterial, viral, parasitic, and noninfectious causes of foodborne illness. (*Note: To print the following large tables, users may have to change their printer settings to landscape, print on legal size paper, and/or use a small font size.*)

Foodborne Illnesses (Bacterial)

Etiology	Incubation Period	Signs and Symptoms	Duration of Illness	Associated Foods	L
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Etiology	Incubation Period	Signs and Symptoms	Duration of Illness	Associated Foods	L
<i>Bacillus anthracis</i>	2 days to weeks	Nausea, vomiting, malaise, bloody diarrhea, acute abdominal pain.	Weeks	Insufficiently cooked contaminated meat.	Bloo
<i>Bacillus cereus</i> (preformed enterotoxin)	1 to 6 hours	Sudden onset of severe nausea and vomiting. Diarrhea may be present.	24 hours	Improperly refrigerated cooked and fried rice, meats.	Norm clini Clini labo not iden orga indio stoo spec refer labo cultu iden
<i>Bacillus cereus</i> (diarrheal toxin)	10 to 16 hours	Abdominal cramps, watery diarrhea, nausea.	24 to 48 hours	Meats, stews, gravies, vanilla sauce.	Test neces limit testi stoo outb
<i>Brucella abortus</i> , <i>Brucella melitensis</i> , and <i>Brucella suis</i>	7 to 21 days	Fever, chills, sweating, weakness, headache, muscle and joint pain, diarrhea, bloody stools during acute phase.	Weeks	Raw milk, goat cheese made from unpasteurized milk, contaminated meats.	Bloo posi
<i>Campylobacter jejuni</i>	2 to 5 days	Diarrhea, cramps, fever, and vomiting;	2 to 10 days	Raw and undercooked	Rout cultu

Etiology	Incubation Period	Signs and Symptoms	Duration of Illness	Associated Foods	L
		diarrhea may be bloody.		poultry, unpasteurized milk, contaminated water.	Cam req med incu degr grow
<i>Clostridium botulinum</i> -children and adults (preformed toxin)	12 to 72 hours	Vomiting, diarrhea, blurred vision, diplopia, dysphagia, and descending muscle weakness.	Variable (from 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, herb-infused oils, baked potatoes in aluminum foil, cheese sauce, bottled garlic, foods held warm for extended periods of time (e.g. in a warm oven).	Stoc and test Stoc can cult orga test perf som heal depa labo the Dise and (CD
<i>Clostridium botulinum</i> -infants	3 to 30 days	In infants <12 months, lethargy, weakness, poor feeding, constipation, hypotonia, poor head control, poor gag and sucking reflex.	Variable	Honey, home-canned vegetables and fruits, corn syrup.	Stoc and test Stoc can cult orga test perf som

Etiology	Incubation Period	Signs and Symptoms	Duration of Illness	Associated Foods	L
					heal depa labo the
<i>Clostridium perfringens</i> toxin	8 to 16 hours	Watery diarrhea, nausea, abdominal cramps; fever is rare.	24 to 48 hours	Meats, poultry, gravy, dried or precooked foods, time- and/or temperature-abused food.	Stoc test ente cult orga Beca <i>Clos</i> <i>perfr</i> norm foun quan cult done
Enterohemorrhagic <i>Escherichia coli</i> (EHEC) including <i>Escherichia coli</i> 0157:H7 and other Shiga toxin-producing <i>Escherichia coli</i> (STEC)	1 to 8 days	Severe diarrhea that is often bloody, abdominal pain and vomiting. Usually little or no fever is present. More common in children <4 years.	5 to 10 days	Undercooked beef especially hamburger, unpasteurized milk and juice, raw fruits and vegetables (e.g. sprouts), salami (rarely), and contaminated water.	Stoc <i>Esch</i> 015 spec grow <i>Esch</i> 015 susp spec mus requ toxin be d com posi shou forw publ labo conf sero

Etiology	Incubation Period	Signs and Symptoms	Duration of Illness	Associated Foods	L
Enterotoxigenic <i>Escherichia coli</i> (ETEC)	1 to 3 days	Watery diarrhea, abdominal cramps, some vomiting.	3 to >7 days	Water or food contaminated with human feces.	Stoo ETEC spec labo tech iden susp requ testi
<i>Listeria monocytogenes</i>	9 to 48 hours for gastrointestinal symptoms, 2 to 6 weeks for invasive disease.	Fever, muscle aches, and nausea or diarrhea. Pregnant women may have mild flu-like illness, and infection can lead to premature delivery or stillbirth. Elderly or immunocompromised patients may have bacteremia or meningitis.	Variable	Fresh soft cheeses, unpasteurized milk, inadequately pasteurized milk, ready-to-eat deli meats, hot dogs.	Bloo cere fluid Asyn feca occu ther cultu not Anti liste may iden retro
	At birth and infancy	Infants infected from mother at risk for sepsis or meningitis.			
<i>Salmonella</i> species	1 to 3 days	Diarrhea, fever, abdominal cramps, vomiting. <i>Salmonella typhi</i> and <i>Salmonella paratyphi</i> produce typhoid with insidious onset characterized by fever, headache, constipation, malaise, chills, and myalgia; diarrhea is uncommon, and vomiting is usually not severe.	4 to 7 days	Contaminated eggs, poultry, unpasteurized milk or juice, cheese, contaminated raw fruits and vegetables (alfalfa sprouts, melons). <i>Salmonella typhi</i> epidemics are	Rou cultu

Etiology	Incubation Period	Signs and Symptoms	Duration of Illness	Associated Foods	L
				often related to fecal contamination of water supplies or street-vended foods.	
<i>Shigella</i> species	24 to 48 hours	Abdominal cramps, fever, and diarrhea. Stools may contain blood and mucus.	4 to 7 days	Food or water contaminated with fecal material. Usually person-to-person spread, fecal-oral transmission. Ready-to-eat foods touched by infected food workers(e.g., raw vegetables, salads, sandwiches).	Rout cultu
<i>Staphylococcus aureus</i> (preformed enterotoxin)	1 to 6 hours	Sudden onset of severe nausea and vomiting. Abdominal cramps. Diarrhea and fever may be present.	24 to 48 hours	Unrefrigerated or improperly refrigerated meats, potato and egg salads, cream pastries.	Norm clini Stoo and test and india
<i>Vibrio cholerae</i> (toxin)	24 to 72 hours	Profuse watery diarrhea and vomiting, which can lead to severe dehydration and death within hours.	3 to 7 days. Causes life-threatening dehydration.	Contaminated water, fish, shellfish, street-vended food typically from Latin America or Asia.	Stoo <i>Vibr</i> requ med <i>Vibr</i> susp requ testi

Etiology	Incubation Period	Signs and Symptoms	Duration of Illness	Associated Foods	L
<i>Vibrio parahaemolyticus</i>	2 to 48 hours	Watery diarrhea, abdominal cramps, nausea, vomiting.	2 to 5 days	Undercooked or raw seafood, such as fish, shellfish.	Stoo <i>Vibr</i> <i>para</i> requ med <i>Vibr</i> <i>para</i> is su mus spec
<i>Vibrio vulnificus</i>	1 to 7 days	Vomiting, diarrhea, abdominal pain, bacteremia, and wound infections. More common in the immunocompromised, or in patients with chronic liver disease (presenting with bullous skin lesions). Can be fatal in patients with liver disease and the immunocompromised.	2 to 8 days	Undercooked or raw shellfish, especially oysters; other contaminated seafood, and open wounds exposed to seawater.	Stoo bloo <i>Vibr</i> requ med <i>Vibr</i> is su mus spec
<i>Yersinia enterocolitica</i> and <i>Yersinia pseudotuberculosis</i>	24 to 48 hours	Appendicitis-like symptoms (diarrhea and vomiting, fever, and abdominal pain) occur primarily in older children and young adults. May have a scarlatiniform rash with <i>Yersinia pseudotuberculosis</i> .	1 to 3 weeks, usually self-limiting	Undercooked pork, unpasteurized milk, tofu, contaminated water. Infection has occurred in infants whose caregivers handled chitterlings.	Stoo bloo <i>Yers</i> spec grow susp requ testi is av rese refer labo

Foodborne Illnesses (Viral)

Etiology	Incubation Period	Signs and Symptoms	Duration of Illness	Associated Foods	Laboratory Testing
Hepatitis A	28 days average (15 to 50 days)	Diarrhea; dark urine; jaundice; and flu-like symptoms (i.e., fever, headache, nausea, and abdominal pain).	Variable, 2 weeks to 3 months	Shellfish harvested from contaminated waters, raw produce, contaminated drinking water, uncooked foods and cooked foods that are not reheated after contact with infected food handler.	Increase in alanine transferase (ALT), bilirubin. Positive IgM and anti-hepatitis A antibodies.
Noroviruses (and other caliciviruses)	12 to 48 hours	Nausea, vomiting, abdominal cramping, diarrhea fever, myalgia, and some headache. Diarrhea is more prevalent in adults and vomiting is more prevalent in children.	12 to 60 hours	Shellfish, fecally contaminated foods, ready-to-eat foods touched by infected food workers (salads, sandwiches, ice, cookies, fruit).	Routine reverse-transcriptase polymerase chain reaction (RT-PCR) and electron microscopy (EM) on fresh unpreserved stool samples. Clinical diagnosis, negative bacterial cultures. Stool is negative for white blood cells.
Rotavirus	1 to 3 days	Vomiting, watery diarrhea, low-grade fever. Temporary lactose intolerance may occur. Infants and children, elderly,	4 to 8 days	Fecally contaminated foods. Ready-to-eat foods touched by	Identification of virus in stool via immunoassay.

Etiology	Incubation Period	Signs and Symptoms	Duration of Illness	Associated Foods	Laboratory Testing
		and immunocompromised are especially vulnerable.		infected food workers (salads, fruits).	
Other viral agents (astroviruses, caliciviruses, adenoviruses, parvoviruses)	10 to 70 hours	Nausea, vomiting, diarrhea, malaise, abdominal pain, headache, fever	2 to 9 days	Fecally contaminated foods. Ready-to-eat foods touched by infected food workers. Some shellfish.	Identification of the virus in early acute stool samples. Serology. Commercial enzyme-linked immunosorbent assay (ELISA) kits are now available to adenoviruses and astroviruses.

Foodborne Illnesses (Parasitic)

Etiology	Incubation Period	Signs and Symptoms	Duration of Illness	Associated Foods	Laboratory Testing
<i>Angiostrongylus cantonensis</i>	1 week to ≥ 1 month	Severe headaches, nausea, vomiting, neck stiffness, paresthesias, hyperesthesias, seizures, and other neurologic abnormalities.	Several weeks to several months	Raw or undercooked intermediate hosts (e.g., snails or slugs), infected paratenic (transport) hosts (e.g., crabs, fresh water shrimp), fresh produce contaminated with intermediate or transport	Examination of cerebrospinal fluid (CSF) for elevated pressure, protein, leukocytes, and eosinophils; serologic testing using ELISA to detect antibodies to <i>Angiostrongylus cantonensis</i> .

Etiology	Incubation Period	Signs and Symptoms	Duration of Illness	Associated Foods	Laboratory Testing
				hosts.	
<i>Cryptosporidium</i>	2 to 10 days	Diarrhea (usually watery), stomach cramps, upset stomach, slight fever.	May be remitting and relapsing over weeks to months	Any uncooked food or food contaminated by an ill food handler after cooking, drinking water.	Request specific examination of the stool for <i>Cryptosporidium</i> . May need to examine water or food.
<i>Cyclospora cayentanensis</i>	1 to 14 days, usually at least 1 week	Diarrhea (usually watery), loss of appetite, substantial loss of weight, stomach cramps, nausea, vomiting, fatigue.	May be remitting and relapsing over weeks to months	Various types of fresh produce (imported berries, lettuce)	Request specific examination of the stool for <i>Cyclospora</i> . May need to examine water or food.
<i>Entamoeba histolytica</i>	2 to 3 days to 1 to 4 weeks	Diarrhea (often bloody), frequent bowel movements, lower abdominal pain.	May be protracted (several weeks to several months)	Any uncooked food or food contaminated by an ill food handler after cooking, drinking water.	Examination of stool for cysts and parasites- at least 3 samples. Serology for long-term infections.
<i>Giardia lamblia</i>	1 to 2 weeks	Diarrhea, stomach cramps, gas.	Days to weeks	Any uncooked food or food contaminated by an ill food handler after cooking, drinking water.	Examination of stool for ova and parasites- may need at least 3 samples.
<i>Toxoplasma gondii</i>	5 to 23 days	Generally asymptomatic, 20% may develop cervical lymphadenopathy and/or a flu-like illness.	Months	Accidental ingestion of contaminated substances (e.g., soil contaminated	Isolation of parasites from blood or other body fluids; observation of parasites in

Etiology	Incubation Period	Signs and Symptoms	Duration of Illness	Associated Foods	Laboratory Testing
		<p><u>In immunocompromised patients:</u> central nervous system (CNS) disease, myocarditis, or pneumonitis is often seen.</p>		<p>with cat feces, on fruits and vegetables, raw or partly cooked meat [especially pork, lamb, or venison]).</p>	<p>patient specimens via microscopy or histology. Detection of organisms is rare, serology (reference laboratory needed) can be a useful adjunct in diagnosing toxoplasmosis. However, IgM antibodies may persist for 6 to 18 months and thus may not necessarily indicate recent infection. PCR of bodily fluids.</p> <p><u>For congenital infection:</u> isolation of <i>Toxoplasma gondii</i> from placenta, umbilical cord or infant blood. PCR of white blood cells, cerebrospinal fluid or amniotic fluid, or IgM and IgA serology, performed by reference laboratory.</p>
<p><i>Toxoplasma gondii</i> (congenital infection)</p>	<p>In infants at birth</p>	<p>Treatment of the mother may reduce severity and/or incidence of congenital infection. Most infected infants</p>	<p>Months</p>	<p>Passed from mother (who acquired acute infection during</p>	

Etiology	Incubation Period	Signs and Symptoms	Duration of Illness	Associated Foods	Laboratory Testing
		have few symptoms at birth. Later, they will generally develop signs of congenital toxoplasmosis (mental retardation, severely impaired eyesight, cerebral palsy, seizures) unless the infection is treated.		pregnancy) to child.	
<i>Trichinella spiralis</i>	1 to 2 days for initial symptoms; others begin 2 to 8 weeks after infection	Acute: nausea, vomiting, diarrhea, fatigue, fever, abdominal discomfort followed by muscle soreness, weakness, and occasional cardiac and neurologic complications.	Months	Raw or undercooked contaminated meat, usually pork or wild game meat (e.g., bear or moose).	Positive serology or demonstration of larvae via muscle biopsy. Increase in eosinophils.

Foodborne Illnesses (Non-Infectious)

Etiology	Incubation Period	Signs and Symptoms	Duration of Illness	Associated Foods	Laboratory Testing
Antimony	5 minutes to 8 hours; usually <1 hour	Vomiting, metallic taste.	Usually self-limited	Metallic container.	Identification of metal in beverage or food.
Arsenic	Few hours	Vomiting, colic, diarrhea.	Several days	Contaminated food.	Urine. May cause eosinophilia.
Cadmium	5 minutes to 8 hours; usually <1 hour	Nausea, vomiting, myalgia, increase in	Usually self-limited	Seafood, oysters, clams, lobster,	Identification of metal in food.

Etiology	Incubation Period	Signs and Symptoms	Duration of Illness	Associated Foods	Laboratory Testing
		salivation, stomach pain.		grains, peanuts.	
Ciguatera fish poisoning (ciguatera toxin)	2 to 6 hours	<u>Gastrointestinal</u> : abdominal pain, nausea, vomiting, diarrhea.	Days to weeks to months	A variety of large reef fish. Grouper, red snapper, amberjack, and barracuda (most common).	Radioassay for toxin in fish or a consistent history.
	3 hours	<u>Neurologic</u> : paresthesias, reversal of hot or cold, pain, weakness.			
	2 to 5 days	<u>Cardiovascular</u> : bradycardia, hypotension, increase in T wave abnormalities.			
Copper	5 minutes to 8 hours; usually <1 hour	Nausea, vomiting, blue or green vomitus.	Usually self-limited	Metallic container.	Identification of metal in beverage or food.
Mercury	1 week or longer	Numbness, weakness of legs, spastic paralysis, impaired vision, blindness, coma. Pregnant women and the developing fetus are especially vulnerable.	May be protracted	Fish exposed to organic mercury, grains treated with mercury fungicides.	Analysis of blood, hair.
Mushroom toxins, short-acting	<2 hours	Vomiting, diarrhea,	Self-limited	Wild mushrooms	Typical syndrome and

Etiology	Incubation Period	Signs and Symptoms	Duration of Illness	Associated Foods	Laboratory Testing
(museinol, muscarine, psilocybin, coprinus artemetaris, ibotenic acid)		confusion, visual disturbance, salivation, diaphoresis, hallucinations, disulfiram-like reaction, confusion, visual disturbance.		(cooking may not destroy these toxins).	mushroom identified or demonstration of the toxin.
Mushroom toxin, long-acting (amanitin)	4 to 8 hours diarrhea; 24 to 48 hours liver failure	Diarrhea, abdominal cramps, leading to hepatic and renal failure.	Often fatal	Mushrooms.	Typical syndrome and mushroom identified and/or demonstration of the toxin.
Nitrite poisoning	1 to 2 hours	Nausea, vomiting, cyanosis, headache, dizziness, weakness, loss of consciousness, chocolate-brown colored blood.	Usually self-limited	Cured meats, any contaminated foods, spinach exposed to nitrification.	Analysis of the food, blood.
Pesticides (organophosphates or carbamates)	Few minutes to few hours	Nausea, vomiting, abdominal cramps, diarrhea, headache, nervousness, blurred vision, twitching, convulsions, salivation and meiosis.	Usually self-limited	Any contaminated food.	Analysis of the food, blood.
Puffer Fish (tetrodotoxin)	<30 minutes	Paresthesias, vomiting, diarrhea,	Death usually in 4 to 6	Puffer fish.	Detection of tetrodotoxin in fish.

Etiology	Incubation Period	Signs and Symptoms	Duration of Illness	Associated Foods	Laboratory Testing
		abdominal pain, ascending paralysis, respiratory failure.	hours		
Scombroid (histamine)	1 min to 3 hours	Flushing, rash, burning sensation of skin, mouth and throat, dizziness, urticaria, paresthesias.	3 to 6 hours	Fish: bluefin, tuna, skipjack, mackerel, marlin, escolar, and mahi mahi.	Demonstration of histamine in food or clinical diagnosis.
Shellfish toxins (diarrheic, neurotoxic, amnesic)	Diarrheic shellfish poisoning (DSP)-30 min to 2 hours	Nausea, vomiting, diarrhea, and abdominal pain accompanied by chills, headache, and fever.	Hours to 2-3 days	A variety of shellfish, primarily mussels, oysters, scallops, and shellfish from the Florida coast and the Gulf of Mexico.	Detection of the toxin in shellfish; high pressure liquid chromatography
	Neurotoxic shellfish poisoning (NSP)-few minutes to hours	Tingling and numbness of lips, tongue, and throat, muscular aches, dizziness, reversal of the sensations of hot and cold, diarrhea, and vomiting.			
	Amnesic shellfish poisoning (ASP)-24 to 48 hours	Vomiting, diarrhea, abdominal pain and neurological problems such as confusion, memory loss,			

Etiology	Incubation Period	Signs and Symptoms	Duration of Illness	Associated Foods	Laboratory Testing
		disorientation, seizure, coma.			
Shellfish toxins (paralytic shellfish poisoning)	30 min to 3 hours	Diarrhea, nausea, vomiting leading to paresthesias of mouth, lips, weakness, dysphasia, dysphonia, respiratory paralysis.	Days	Scallops, mussels, clams, cockles.	Detection of toxin in food or water where fish are located; high pressure liquid chromatography
Sodium fluoride	Few min to 2 hours	Salty or soapy taste, numbness of mouth, vomiting, diarrhea, dilated pupils, spasms, pallor, shock, collapse.	Usually self-limited	Dry foods (such as dry milk, flour, baking powder, cake mixes) contaminated with sodium fluoride-containing insecticides and rodenticides.	Testing of vomitus or gastric washings. Analysis of the food.
Thallium	Few hours	Nausea, vomiting, diarrhea, painful paresthesias, motor polyneuropathy, hair loss.	Several days	Contaminated food.	Urine, hair.
Tin	5 min to 8 hours; usually <1 hour	Nausea, vomiting, diarrhea.	Usually self-limited	Metallic container.	Analysis of the food.
Vomitoxin	Few min to 3 hours	Nausea, headache, abdominal pain, vomiting.	Usually self-limited	Grains, such as wheat, corn, barley.	Analysis of the food.

Etiology	Incubation Period	Signs and Symptoms	Duration of Illness	Associated Foods	Laboratory Testing
Zinc	Few hours	Stomach cramps, nausea, vomiting, diarrhea, myalgias.	Usually self-limited	Metallic container.	Analysis of the food, blood and feces, saliva or urine.

Surveillance and Reporting of Foodborne Illnesses

The following lists current reporting requirements for foodborne diseases and conditions in the United States. National reporting requirements are determined collaboratively by the Council of State and Territorial Epidemiologists and the Centers for Disease Control and Prevention (CDC).

Notifiable BACTERIAL Foodborne Diseases and Conditions

- Anthrax
- Botulism
- Brucellosis
- Cholera
- *Enterohemorrhagic Escherichia coli*
- Hemolytic uremic syndrome, post-diarrheal
- Listeriosis
- Salmonellosis (other than *Salmonella Typhi*)
- Shigellosis
- Typhoid fever (*Salmonella Typhi* and *Salmonella Paratyphi* infections)

Notifiable VIRAL Foodborne Diseases and Conditions

- Hepatitis A

Notifiable PARASITIC Foodborne Diseases and Conditions

- Cryptosporidiosis
- Cyclosporiasis
- Giardiasis
- Trichinellosis

In the United States, additional reporting requirements may be mandated by state and territorial laws and regulations. Details on specific state reporting requirements are available from the:

- **Council of State and Territorial Epidemiologists.** Information is available electronically at <http://www.cste.org/nndss/reportingrequirements.htm>.
- **Centers for Disease Control and Prevention.** Information is available electronically at <http://www.cdc.gov/epo/dphsi/phs/infdis2003.htm>.

Typically, the appropriate procedure for physicians to follow in reporting foodborne illnesses is to contact the local or state health department whenever they identify a specific notifiable foodborne disease. However, it is often unclear if a patient has a foodborne illness prior to diagnostic tests, so health care professionals should also report potential foodborne illnesses, such as when two or more patients present with a similar illness that may have resulted from the ingestion of a common food. Local health departments then report the illnesses to the state health department and determine if further investigation is warranted.

In addition to reporting cases of potential foodborne illnesses, it is important for physicians to report noticeable increases in unusual illnesses, symptom complexes, or disease patterns (even without definitive diagnosis) to public health authorities. Prompt reporting of unusual patterns of diarrheal/gastrointestinal tract illness, for example, can allow public health officials to initiate an epidemiologic investigation earlier than would be possible if the report awaited definitive etiologic diagnosis.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

Not applicable

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

General benefits include:

Prevent and control food-related disease outbreaks.

Specific benefits include:

Foodborne disease reporting is not only important for disease prevention and control, but more accurate assessments of the burden of foodborne illness in the community occur when physicians report foodborne illnesses to the local or state health department. In addition, reporting of cases of foodborne illness by practicing physicians to the local health department may help the health officer identify a foodborne disease outbreak in the community. This may lead to early identification and removal of contaminated products from the commercial market. Occasionally, reporting may lead to the identification of a previously unrecognized agent of foodborne illness. Reporting also may lead to identification and appropriate management of human carriers of known foodborne pathogens, especially those with high-risk occupations for disease transmission such as food workers.

Subgroups Most Likely to Benefit:

Young, elderly, and immunocompromised patients

POTENTIAL HARMS

Not stated

QUALIFYING STATEMENTS**QUALIFYING STATEMENTS**

This primer is not a clinical guideline or definitive resource for the diagnosis and treatment of foodborne illness. Safe food handling practices and technologies (e.g., irradiation, food processing and storage) also are not addressed.

IMPLEMENTATION OF THE GUIDELINE**DESCRIPTION OF IMPLEMENTATION STRATEGY**

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES**IOM CARE NEED**

Getting Better
Staying Healthy

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY**BIBLIOGRAPHIC SOURCE(S)**

American Medical Association, American Nurses Association, American Nurses Foundation, Centers for Disease Control and Prevention, Center for Food Safety and Applied Nutrition, U.S. Food and Drug Administration, Food Safety and Inspection Service, U.S. Department of Agriculture. Diagnosis and management of foodborne illnesses: a primer for physicians and other health care professionals. MMWR Recomm Rep 2004 Apr 16;53(RR-4):1-33. [PubMed](#)

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2001 Jan (revised 2004 Apr 16)

GUIDELINE DEVELOPER(S)

American Medical Association - Medical Specialty Society
Center for Food Safety and Applied Nutrition - Federal Government Agency [U.S.]
Centers for Disease Control and Prevention - Federal Government Agency [U.S.]
Food Safety and Inspection Service - Federal Government Agency [U.S.]

GUIDELINE DEVELOPER COMMENT

This primer was developed collaboratively by the American Medical Association, the Centers for Disease Control and Prevention (CDC), the Center for Food Safety and Nutrition, Food and Drug Administration (U.S.), and the Food Safety and Inspection Service, Department of Agriculture (U.S.) as part of the National Food Safety Initiative implemented under former President William Jefferson Clinton.

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GUIDELINE COMMITTEE

Not stated

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Elaine F. Brainerd, R.N., M.A., has indicated that she has a financial relationship with Centers for Disease Control and Prevention (CDC) because she is the Director of a Food Safe Schools project that is funded under a cooperative agreement by CDC. The remaining preparers have signed a conflict of interest disclosure form that verifies no conflict of interest.

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Diagnosis and management of foodborne illnesses: a primer for physicians. MMWR Recomm Rep 2001 Jan 26;50 (RR-2):1-69.

GUIDELINE AVAILABILITY

Electronic copies: Available from the [Centers for Disease Control and Prevention \(CDC\) Web site](#).

Print copies: Available from the Centers for Disease Control and Prevention, MMWR, Atlanta, GA 30333. Additional copies can be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9325; (202) 783-3238. Copies are also available from the American Medical Association, 515 North State Street, Chicago, IL 60610; Web site: www.ama-assn.org.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on May 8, 2001. This summary was updated on August 17, 2004. This summary was updated by ECRI Institute on July 28, 2008 following the U.S. Food and Drug Administration advisory on fluoroquinolone antimicrobial drugs.

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