

Diagnosis and Management of Foodborne Illnesses

A Primer for Physicians and
Other Health Care Professionals

Foodborne Illnesses Table: Bacterial Agents

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

February 2004

Foodborne Illnesses (Bacterial)

Etiology	Incubation Period	Signs and Symptoms	Duration of Illness	Associated Foods	Laboratory Testing	Treatment
<i>Bacillus anthracis</i>	2 days to weeks	Nausea, vomiting, malaise, bloody diarrhea, acute abdominal pain.	Weeks	Insufficiently cooked contaminated meat.	Blood.	Penicillin is first choice for naturally acquired gastrointestinal anthrax. Ciprofloxacin is second option.
<i>Bacillus cereus</i> (diarrheal toxin)	10-16 hrs	Abdominal cramps, watery diarrhea, nausea.	24-48 hours	Meats, stews, gravies, vanilla sauce.	Testing not necessary, self-limiting (consider testing food and stool for toxin in outbreaks).	Supportive care
<i>Bacillus cereus</i> (preformed enterotoxin)	1-6 hrs	Sudden onset of severe nausea and vomiting. Diarrhea may be present.	24 hrs	Improperly refrigerated cooked and fried rice, meats.	Normally a clinical diagnosis. Clinical laboratories do not routinely identify this organism. If indicated, send stool and food specimens to reference laboratory for culture and toxin identification.	Supportive care.
<i>Brucella abortus</i> , <i>B. melitensis</i> , and <i>B. suis</i>	7-21 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.	Blood culture and positive serology.	<i>Acute</i> : Rifampin and doxycycline daily for ≥6 weeks. Infections with complications require combination therapy with rifampin, tetracycline and an aminoglycoside.
<i>Campylobacter jejuni</i>	2-5 days	Diarrhea, cramps, fever, and vomiting; diarrhea may be bloody.	2-10 days	Raw and undercooked poultry, unpasteurized milk, contaminated water.	Routine stool culture; <i>Campylobacter</i> requires special media and incubation at 42°C to grow.	Supportive care. For severe cases, antibiotics such as erythromycin and quinolones may be indicated early in the diarrheal disease. Guillain-Barré syndrome can be a sequela.
<i>Clostridium botulinum</i> – children and adults (preformed toxin)	12-72 hrs	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 (eg, in a warm oven).	Stool, serum, and food can be tested for toxin. Stool and food can also be cultured for the organism. These tests can be performed at some State Health Department Laboratories and CDC.	Supportive care. Botulinum antitoxin is helpful if given early in the course of the illness. Contact the state health department. The 24-hour number for state health departments to call is 770 488-7100
<i>Clostridium botulinum</i> – infants	3-30 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	Stool, serum, and food can be tested for toxin. Stool and food can also be cultured for the organism. These tests can be performed at some State Health Department laboratories and CDC.	Supportive care. Botulism immune globulin can be obtained from the Infant Botulism Prevention Program, Health and Human Services, California at 510 540-2646. Botulinum antitoxin is generally not recommended for infants.
<i>Clostridium perfringens</i> toxin	8-16 hrs	Watery diarrhea, nausea, abdominal cramps; fever is rare.	24-48 hrs	Meats, poultry, gravy, dried or precooked foods, time-and/or temperature-abused food.	Stools can be tested for enterotoxin and cultured for organism. Because <i>Clostridium perfringens</i> can normally be found in stool, quantitative cultures must be done.	Supportive care. Antibiotics not indicated.
Enterohemorrhagic <i>E. coli</i> (EHEC) including <i>E. coli</i> O157:H7 and other Shiga toxin-producing <i>E. coli</i> (STEC)	1-8 days	Severe diarrhea that is often bloody, abdominal pain and vomiting. Usually, little or no fever is present. More common in children <4 years.	5-10 days.	Undercooked beef especially hamburger, unpasteurized milk and juice, raw fruits and vegetables (e.g. sprouts), salami (rarely), and contaminated water.	Stool culture; <i>E. coli</i> O157:H7 requires special media to grow. If <i>E. coli</i> O157:H7 is suspected, specific testing must be requested. Shiga toxin testing may be done using commercial kits; positive isolates should be forwarded to public health laboratories for confirmation and serotyping.	Supportive care, monitor renal function, hemoglobin, and platelets closely. <i>E. coli</i> O157:H7 infection is also associated with hemolytic uremic syndrome (HUS), which can cause lifelong complications. Studies indicate that antibiotics may promote the development of HUS.
Enterotoxigenic <i>E. coli</i> (ETEC)	1-3 days	Watery diarrhea, abdominal cramps, some vomiting.	3->7 days	Water or food contaminated with human feces.	Stool culture. ETEC requires special laboratory techniques for identification. If suspected, must request specific testing.	Supportive care. Antibiotics are rarely needed except in severe cases. Recommended antibiotics include TMP-SMX and quinolones.
<i>Listeria monocytogenes</i>	9-48 hrs for gastrointestinal symptoms, 2-6 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 or inadequately pasteurized milk, ready-to-eat deli meats, hot dogs.	Blood or cerebrospinal fluid cultures. Asymptomatic fecal carriage occurs; therefore, stool culture usually not helpful. Antibody to listeriolysin O may be helpful to identify outbreak retrospectively.	Supportive care and antibiotics; Intravenous ampicillin, penicillin, or TMP-SMX are recommended for invasive disease.
	At birth and infancy	Infants infected from mother at risk for sepsis or meningitis.				
<i>Salmonella</i> spp.	1-3 days	Diarrhea, fever, abdominal cramps, vomiting. <i>S. Typhi</i> and <i>S. 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.	4-7 days	Contaminated eggs, poultry, unpasteurized milk or juice, cheese, contaminated raw fruits and vegetables (alfalfa sprouts, melons). <i>S. Typhi</i> epidemics are often related to fecal contamination of water supplies or street-vended foods.	Routine stool cultures.	Supportive care. Other than for <i>S. Typhi</i> and <i>S. Paratyphi</i> , antibiotics are not indicated unless there is extra-intestinal spread, or the risk of extra-intestinal spread, of the infection. Consider ampicillin, gentamicin, TMP-SMX, or quinolones if indicated. A vaccine exists for <i>S. Typhi</i> .
<i>Shigella</i> spp.	24-48 hrs	Abdominal cramps, fever, and diarrhea. Stools may contain blood and mucus.	4-7 days	Food or water contaminated with human 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.	Routine stool cultures.	Supportive care. TMP-SMX recommended in the US if organism is susceptible; nalidixic acid or other quinolones may be indicated if organism is resistant, especially in developing countries.
<i>Staphylococcus aureus</i> (preformed enterotoxin)	1-6 hrs	Sudden onset of severe nausea and vomiting. Abdominal cramps. Diarrhea and fever may be present.	24-48 hrs	Unrefrigerated or improperly refrigerated meats, potato and egg salads, cream pastries.	Normally a clinical diagnosis. Stool, vomitus, and food can be tested for toxin and cultured if indicated.	Supportive care
<i>Vibrio cholerae</i> (toxin)	24-72 hrs	Profuse watery diarrhea and vomiting, which can lead to severe dehydration and death within hours.	3-7 days. Causes life-threatening dehydration.	Contaminated water, fish, shellfish, street-vended food, typically from Latin America or Asia.	Stool culture; <i>Vibrio cholerae</i> requires special media to grow. If <i>V. cholerae</i> is suspected, must request specific testing.	Supportive care with aggressive oral and intravenous rehydration. In cases of confirmed cholera, tetracycline or doxycycline is recommended for adults, and TMP-SMX for children (<8 years).
<i>Vibrio parahaemolyticus</i>	2-48 hrs	Watery diarrhea, abdominal cramps, nausea, vomiting.	2-5 days	Undercooked or raw seafood, such as fish, shellfish.	Stool cultures. <i>Vibrio parahaemolyticus</i> requires special media to grow. If <i>V. parahaemolyticus</i> is suspected, must request specific testing.	Supportive care. Antibiotics are recommended in severe cases: tetracycline, doxycycline, gentamicin, and cefotaxime.
<i>Vibrio vulnificus</i>	1-7 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.	2-8 days	Undercooked or raw shellfish, especially oysters; other contaminated seafood, and open wounds exposed to sea water.	Stool, wound, or blood cultures. <i>Vibrio vulnificus</i> requires special media to grow. If <i>V. vulnificus</i> is suspected, must request specific testing.	Supportive care and antibiotics; tetracycline, doxycycline, and ceftazidime are recommended.
<i>Yersinia enterocolytica</i> and <i>Y. pseudotuberculosis</i>	24-48 hrs	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>Y. pseudotuberculosis</i> .	1-3 weeks, usually self-limiting	Undercooked pork, unpasteurized milk, tofu, contaminated water. Infection has occurred in infants whose caregivers handled chitterlings.	Stool, vomitus or blood culture. <i>Yersinia</i> requires special media to grow. If suspected, must request specific testing. Serology is available in research and reference laboratories.	Supportive care. If septicemia or other invasive disease occurs, antibiotic therapy with gentamicin or cefotaxime (doxycycline and ciprofloxacin also effective).

Please call the state health department for more information on specific foodborne illnesses. These telephone numbers are available at: <http://www.cdc.gov/mmwr/international/relres.html>.

See the reverse side for information hotlines and list of notifiable diseases.

Foodborne Diseases and Conditions Designated as Notifiable at the National Level – United States 2003

In the United States, requirements for reporting diseases and conditions are mandated by state and territorial laws and/or regulations. However, physicians are highly encouraged to report foodborne illness that they may encounter in the event that an outbreak situation may be present. Reporting will facilitate the tracking of the outbreak and in fact, the case identified may even be the sentinel case!

Differences exist between states and territories as to which diseases and conditions are reportable. The Council of State and Territorial Epidemiologists (CSTE) and the Centers for Disease Control and Prevention (CDC) collaborate on which diseases and conditions are designated as nationally notifiable. Details on specific state requirements are located at www.cste.org/nndss/reportingrequirements.htm. This information is also available by contacting CSTE at:

The Council of State and Territorial Epidemiologists (CSTE)
Suite 303 – 2872 Woodcock Boulevard
Atlanta, Georgia 30341
Phone: 770 458-3811

Notifiable Bacterial Foodborne Diseases and Conditions

Anthrax

Botulism

Brucellosis

Cholera

Enterohemorrhagic *Escherichia coli*

Hemolytic uremic syndrome, post-diarrheal

Listeriosis

Salmonellosis (other than *S. Typhi*)

Shigellosis

Typhoid fever (*S. Typhi* and *S. Paratyphi* infections)

Notifiable Viral Foodborne Diseases and Conditions

Hepatitis A

Notifiable Parasitic Foodborne Diseases and Conditions

Cryptosporidiosis

Cyclosporiasis

Giardiasis

Trichinellosis

References

Council of State and Territorial Epidemiologists. Available at:
www.cste.org/nndss/reportingrequirements.htm.

Centers for Disease Control and Prevention. Available at
www.cdc.gov/epo/dphsi/phs/infdis2003.htm

Toll-free Information Phone Numbers

USDA Meat and Poultry Hotline: 800 535-4555

FDA Safe Food Hotline: 888 SAFE-FOOD (723-3366)

CDC Voice Information System: 888 CDC-FAXX (232-3299)