



The Epidemiology of Foodborne Diseases

McHenry County Department of Health

Communicable Disease



(815) 334-4500

| PATHOGEN | INCUBATION PERIOD/ COMMUNICABILITY | ASSOCIATED FOODS | SIGNS AND SYMPTOMS | TREATMENT | PUBLIC HEALTH ISSUES |
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| <i>Bacillus anthracis</i> (anthrax-gastrointestinal) | 1-7 days, although up to 60 days possible. Not communicable person to person. | Ingestion of contaminated undercooked food. | Nausea, vomiting, malaise, bloody diarrhea, acute abdominal pain. | Penicillin is first choice naturally acquired gastrointestinal anthrax. Ciprofloxacin is a second option. | Notify public health (PH) immediately. Anthrax is a potential bioterrorism agent |
| <i>Bacillus cereus</i> (diarrheal toxin) | 6-24 hours. Not communicable person to person. | Mishandling of foods, including meats, stews, and gravies | Abdominal cramps, watery diarrhea, nausea. Fever is rare. | Rehydration. Illness is self-limiting. Antibiotics are of no use. | Contact PH for consultation or if an outbreak suspected. Foods should not remain at ambient temperature after cooking. Refrigerate leftover food promptly and reheat thoroughly. |
| <i>Bacillus cereus</i> (preformed enterotoxin) | 1-6 hours. Not communicable person to person. | Improperly refrigerated cooked and fried rice; meats. | Sudden onset of severe nausea and vomiting, abdominal cramps. Fever is rare | Rehydration. Illness is self-limiting. Antibiotics are of no use. | Contact PH if an outbreak suspected. Proper cooking and storage of foods, particularly rice cooked for later use. |

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McHENRY COUNTY DEPARTMENT OF HEALTH

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| <p><i>Brucella abortus, B. melitensis, and b. suis</i> (brucellosis)</p> | <p>Highly variable; usually 5-60 days. Not communicable person to person.</p> | <p>Ingestion of raw milk and dairy products (unpasteurized cheese) from infected animals. Also, direct contact with tissues and discharges including aborted fetuses and placentas of infected animals.</p> | <p>Fever, chills, sweating, weakness, headache, muscle and joint pain, diarrhea (may be bloody)</p> | <p>Multiple antibiotics for at least 6 weeks.</p> | <p>Notify PH immediately if an outbreak is suspected. Thorough cooking of pork and poultry. Pasteurization of milk and milk products. Chlorination of water.</p> |
| <p><i>Campylobacter jejuni</i></p> | <p>Usually 2-5 days, with a range of 1-10 days. Communicable through the course of infection (usually several days to several weeks).</p> | <p>Ingestion of undercooked chicken and pork, contaminated food and water, or raw milk.</p> | <p>Diarrhea, cramps, fever, and vomiting; diarrhea may be bloody.</p> | <p>Rehydration. Antibiotics are not generally indicated. For severe cases, antibiotics may be indicated early in the course of illness.</p> | <p>Contact PH immediately if an outbreak is suspected. Thorough cooking of pork and poultry. Pasteurization of milk and milk products. Chlorination of water.</p> |
| <p><i>Clostridium botulinum children and adults</i> (preformed toxin)</p> | <p>Neurologic symptoms usually appear within 12-36 hours. Not communicable person to person</p> | <p>Ingestion of food in which toxin has been formed, predominantly after inadequate heating during preservation and without subsequent adequate cooking.</p> | <p>Vomiting, diarrhea, blurred vision, diplopia, dysphagia, and symmetrical descending muscle weakness.</p> | <p>Intravenous administration as soon as possible of botulism antitoxin. Supportive care, especially for respiratory failure, which is the usual cause of death.</p> | <p>Botulism is a potential bioterrorism agent. Do not use food containers that bulge.</p> |
| <p><i>Clostridium botulinum infants</i></p> | <p>Incubation is estimated to be 3-30 days. Not communicable person to person.</p> | <p>Ingestion of botulinum spores. Possible sources of spores are multiple, and include the following foods: honey, home-canned vegetables and fruits, light and dark corn syrup.</p> | <p>Lethargy, weakness, poor feeding, constipation, hypotonia, poor head control, poor gag and suck mechanism, "failure to thrive."</p> | <p>Supportive care; assisted respiration may be required. Botulism IG has been shown to improve the course of illness. Botulism antitoxin is generally not recommended.</p> | <p>Do not give infants honey.</p> |

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| <i>Clostridium perfringens</i> (toxin) | 6-24 hours, usually 8-12 hours. Not communicable person to person | Ingestion of food that has been contaminated by soil or feces and then held under conditions that permits multiplication of the organism. Specific foods may include meats, poultry, gravy, and dried or precooked foods | Watery diarrhea, nausea, abdominal cramps; fever and vomiting are usually absent. | Rehydration. Antibiotics are of no use. | Contact PH if an outbreak suspected. Do not leave food at room temperature to cool. Roast, stews, and gravies should be thoroughly cooked and divided into smaller quantities for cooling and reheating. |
| <i>Cryptosporidium parvum</i> | Incubation not precisely known; 1-12 days is the likely range, with an average of about 7 days. Communicable from onset of illness to several weeks after symptoms resolve. | Fecal-oral, which includes person to person, animal to person, waterborne, and foodborne transmission. Outbreaks have been associated with unpasteurized apple cider that had been contaminated with cow manure. | Diarrhea, which may be profuse and watery, cramping, abdominal pain. General malaise, fever, anorexia, nausea, and vomiting occur less often. Symptoms often wax and wane. | Rehydration. In immunocompromised persons, experimental treatments include paromomycin and orally administered human serum immunoglobulin or bovine colostrum. | Contact PH if an outbreak suspected. Specific O&P testing must be requested. Persons with diarrhea should not use public recreational water. |
| <i>Cyclospora cayetanensis</i> | Median incubation 1 week. No evidence of communicability person to person. | Ingestion of contaminated water and foods such as imported berries, lettuce, and basil. | Profuse, watery diarrhea, nausea, anorexia, abdominal cramping, fatigue, and weight loss; fever is rare. | TMP/SMX for 7 days may shorten the course of illness. | Contact PH if an outbreak suspected. Consider this diagnosis in persons with prolonged diarrheal illness. Specific O&P testing must be requested. |
| <i>Entamoeba histolytica</i> | Variable, from a few days to several months or years; commonly 1-4 weeks. Communicable during the period those cysts are passed, which may continue for years. | Ingestion of fecally contaminated food or water containing cysts. | Bloody diarrhea, frequent bowel movements, and lower abdominal pain. Dissemination via the bloodstream may occur and produce abscess of the liver or, less commonly, of the lung or brain. | Antiparasitic drugs. Asymptomatic carriers may be treated. Corticosteroids and antimotility drugs can worsen symptoms. | Hand washing. Sanitary disposal of feces, and treatment of drinking water. |

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| <p>Enterohemorrhagic <i>Escherichia coli</i> (EHEC) Includes <i>E. coli</i> O157:H7 and other Shiga toxin producing <i>E. coli</i> (STEC)</p> | <p>2-8 days with a median of 3-4 days. Communicable from onset of illness to a week later in adults; can be up to 3 weeks in one third of children</p> | <p>Ingestion of contaminated foods such as undercooked ground meats, raw milk, and fruits or vegetables contaminated with feces.</p> | <p>Severe diarrhea that is often bloody, abdominal pain and vomiting. Usually little or no fever is present. More common in children <4 yrs. Severe clinical manifestations include hemolytic uremic syndrome (HUS) and thrombotic thrombocytopenic purpura (TTP).</p> | <p>Rehydration. Antimotility drugs may worsen illness. Evidence suggests that treatment with certain antimicrobials may increase risk of complications such as hemolytic uremic syndrome (HUS).</p> | <p>Exclude patients and symptomatic contacts from high-risk settings (foodhandling, direct patient care, and daycare) until two negative stools are collected at least 24 hours apart at least 48 hours after antibiotics are discontinued.</p> |
| <p>Enterotoxigenic <i>E. coli</i> (ETEC) Travelers' diarrhea</p> | <p>Usually 24-72 hours. Communicable for the duration of excretion of the pathogenic ETEC, which may be prolonged.</p> | <p>Ingestion of water or food contaminated with feces.</p> | <p>Watery diarrhea, abdominal cramps, some vomiting</p> | <p>Rehydration. Most cases do not require additional treatment.</p> | <p>Contact PH if an outbreak suspected. When travelling, drink carbonated beverages or bottled water and avoid ice, salads, and fruits that are not peeled. Eat foods hot.</p> |
| <p><i>Giardia lamblia</i></p> | <p>Usually 3-25 days or longer; median 7-10 days. Communicable for the entire period of infection, often months.</p> | <p>Person to person transmission, especially in daycare centers. May also be transmitted through contaminated water.</p> | <p>Acute or chronic diarrhea, flatulence, bloating.</p> | <p>Antiparasitic drugs are available for treatment. Treatment of asymptomatic carriers is not necessary.</p> | <p>Contact PH if an outbreak suspected.</p> |
| <p>Hepatitis A</p> | <p>15-50 days, average 28-30 days. Communicable approximately 2 weeks before and 1 week after onset of jaundice</p> | <p>Person to person by the fecal-oral route. Other sources include shellfish harvested from contaminated waters, raw produce, uncooked foods and cooked foods that are not reheated after contact with infected food handlers.</p> | <p>Diarrhea, dark urine, jaundice, and flu-like symptoms (i.e., fever headache, nausea, and abdominal pain). Many cases, especially infants and children, will be asymptomatic.</p> | <p>Supportive care. Can be prevented by immunization.</p> | <p>Immediate patient interview and assessment by PH. Contact investigation and post-exposure prophylaxis if warranted.</p> |

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| <i>Listeria monocytogenes</i> | Variable; 3-70 days. Median incubation is estimated to be 3 weeks. Communicable for the duration of excretion of the organism. | Ingestion of fresh soft cheeses, unpasteurized milk, ready-to-eat deli meats, hot dogs, undercooked poultry, unwashed raw vegetables. | Fever, muscle aches, and nausea or diarrhea. Pregnant women may have flu-like illness and infection can lead to premature delivery or stillbirth. Elderly, immunocompromised, pregnant women, neonates, alcoholic, cirrhotic, and diabetic people at higher risk | Penicillin or ampicillin alone or together with aminoglycosides. For penicillin-allergic patients, TMP-SMX or erythromycin is preferred. | If pregnant or immunocompromised avoid high-risk foods. Contact PH if an outbreak suspected. |
| <i>Norwalk-like Viruses</i> | Usually 24-48 hours with a range of 10-50 hours. Communicable during acute stage of disease and up to 48 hours after diarrhea stops. | Ingestion of ready-to-eat foods, such as salads, sandwiches, ice, cookies, fruit that are handled by infected persons; poorly cooked shellfish. | Nausea, vomiting, and watery, large-volume diarrhea. | Rehydration. Illness is self-limiting. Antibiotics are of no use. | Contact PH if an outbreak suspected. A common cause of foodborne outbreaks. Ill food handlers should be excluded from work. |
| <i>Rotavirus</i> | Approximately 1-3 days. Communicable during acute stage of disease and later while viral shedding continues (around 8 days) | Ingestion of focally contaminate foods. | Vomiting, watery diarrhea, low-grade fever. Infants and children, elderly and immunocompromised are especially vulnerable. | Rehydration. Antibiotics and antimotility drugs should not be given. | Contact PH if an outbreak suspected. |
| <i>Salmonella spp.</i> | 6-72 hours, average 12-36 hours. Communicability is usually several days to several weeks. Note: antibiotic therapy may prolong excretion. | Contaminated eggs, poultry, unpasteurized milk or juice, cheese, contaminated raw fruits and vegetables (alfalfa sprouts, melons, etc.). | Diarrhea, fever, abdominal cramps, vomiting. | Rehydration. Antibiotics may not eliminate the carrier state and may lead to resistant strains or more severe infections. However, in some high-risk groups antibiotic therapy should be used. | Contact PH if an outbreak suspected. Cook eggs until firm. Thoroughly cook poultry and do not cross-contaminate raw poultry with other ready to eat foods. |

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| <i>Salmonella typhi</i> | Depends on size of infecting dose; from 3 days to 1 month, usual range of 8-14 days. Communicable as long as bacilli appear in excreta, usually from the first week throughout convalescence. 2-5% become carriers. | Fecal contamination of water supplies or street-vended foods. Rare in developed countries | Fever, headache, constipation, malaise, chills and myalgia; diarrhea is uncommon, and vomiting is usually not severe. | Oral ciprofloxacin is the drug of choice for adults. Oral chloramphenicol, amoxicillin or TMP-SMX (particularly in children) have comparable high efficacy for acute infections. There is a vaccine available for <i>S. typhi</i> . | Exclude patients and symptomatic contacts from high-risk settings (foodhandling, direct patient care, and daycare) until 3 negative stools are collected at least 24 hours apart at least 48 hours after antibiotics are discontinued. |
| <i>Shigella spp.</i> | 12-96 hours, average 1-3 days. Communicable during acute infection and up to 4 weeks after onset of illness. | Food or water contaminated with fecal material. Usually person-to-person spread, fecal-oral transmission. Ready-to-eat foods touch by infected food workers | Abdominal cramps, fever and diarrhea. Stool may contain blood and mucus. | Rehydration. If illness is severe, or if epidemiologically indicated, antibiotics may be given to shorten the duration and severity of illness and the duration of pathogen excretion. Antimotility agents are contraindicated as these drugs may prolong the illness. | Exclude patients and symptomatic contacts from high-risk settings (foodhandling, direct patient care, and daycare) until 3 negative stools are collected at least 24 hours apart at least 48 hours after antibiotics are discontinued. |
| <i>Staphylococcus aureus</i> (preformed enterotoxin) | 30min to 8hours average 2-4 hours. Not communicable person to person | Foods that come in contact with the hands of infected food handlers, either without subsequent cooking or with inadequate heating or refrigeration, such as pastries, custards, salad dressing, sandwiches, poultry, sliced meat, and meat products. | Abrupt and sometimes violent onset of severe nausea, abdominal cramps, vomiting, and prostration, often accompanied by diarrhea | Rehydration. Antibiotics are of no use. | Hold cooked food for no more than 4 hours at room temperature. Cooked foods should be refrigerated at temperatures less than 41 degrees Fahrenheit in containers no greater than 4 inches deep. People with boils, abscesses, and other lesions of the hands, face, or nose should be excluded temporarily from handling food |

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| <i>Toxoplasma gondii</i> | Approximately 7 days, with a range of 4-21 days. Not directly transmitted person to person except in utero. | Ingestion of raw or undercooked infected meat (pork or mutton, more rarely beef) containing tissue, cysts, or by ingestion of infective oocysts in food or water contaminated with cat feces | Usually asymptomatic. 20% may develop cervical lymphadenopathy and/or a flu-like illness. In immunocompromised: CNS disease, myocarditis, or pneumonitis is often seen. | Asymptomatic healthy, but infected people do not require treatment. In specific cases spiramycin or pyrimethamine plus sulfadiazine may be used for immunocompromised persons or pregnant women. | Wash hands thoroughly after handling raw meat, after contact with soil that may be contaminated with cat feces, and after cleaning litter boxes. |
| <i>Trichinella spiralis</i> (Trichinosis) | Usually 1-2 weeks. Not communicable person to person. | Ingestion of raw or insufficiently cooked contaminated meat usually pork or wild game meat. | Clinical illness ranges from unapparent infection to a fulminating, fatal disease, depending on the number ingested. | Rehydration and mebendazole. Corticosteroids delay elimination of adult worms from the intestine. | Contact PH if an outbreak suspected. Cook all pork and wild game meat thoroughly. |
| <i>Vibrio cholera</i> (cholera) | From a few hours to 5 days. Usually 1-3 days. Communicable as long as stools are positive usually only a few days after recovery. | Ingestion of contaminated water or food (particularly raw or undercooked shellfish), moist grains held at ambient temperature, and raw or partially dried fish. | Painless profuse diarrhea without abdominal cramps or fever. Stools are colorless with small flecks of mucus (“rice-water”) | Aggressive oral and IV rehydration. In cases of confirmed cholera, tetracycline or doxycycline is recommended for adults and TMP-SMX for children (<8yrs). | Cook all shellfish thoroughly |
| <i>Vibrio parahaemolyticus</i> | Usually 12-24 hours but can range from 4-30 hours. Not communicable person to person. | Ingestion of undercooked or raw seafood, such as fish, shellfish. | Watery diarrhea, abdominal cramps, nausea, and vomiting. | Rehydration. Antibiotics are recommended in severe cases: tetracycline, doxycycline, gentamicin, and cefotaxime. | Cook all seafood thoroughly. Wash hands, surfaces, and cooking utensils after handling raw seafood. |
| <i>Vibrio vulnificus</i> | Usually 12-72 hours after eating raw or undercooked seafood. Not communicable person to person. | Ingestion of raw or undercooked seafood, especially oysters. Open wounds exposed to seawater can also be infected. | Vomiting, diarrhea, abdominal pain, bacteremia, and wound infections. More common in the immunocompromised or in patients with | Rehydration. Tetracycline, doxycycline, and ceftazidime are recommended antibiotics. | Cook all seafood thoroughly. Do not eat raw oysters especially if at high – risk. Any open wound should be rinsed with clean fresh water. |

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| | | | chronic liver disease. | | |
| <i>Yersinia enterocolytica and Y. pseudotuberculosis</i> | Typically 4-6 days, varying from 1-14 days. Communicability is probably for the duration of excretion of the organism, which averages 6 weeks after diagnosis. | Ingestion of contaminated food or water. Pathogenic strains are most commonly isolated from raw pork or pork products. In the US, chitterlings (pig intestines) are a common source of infection. | Appendicitis-like symptoms (diarrhea and vomiting, fever and abdominal pain) occur primarily in older children and young adults. In young children, symptoms include enterocolitis with fever and diarrhea, which often contains blood and mucus. | Rehydration. Illness is usually self-limiting. If septicemia or other invasive disease occurs, antibiotic treatment with gentamicin or cefotaxime. | Contact PH if an outbreak suspected. Thoroughly cook pork products. |

REMEMBER HANDWASHING IS THE MOST IMPORTANT ACT A PERSON CAN DO TO PREVENT TRANSMISSION OF DISEASE!!!



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FOODBORNE ILLNESS-ORGANISMS

Disease Producing Organisms

A. Staphylococci intoxication.

1. 30-50% of the population is a carrier of this organism.
2. Onset time 1-6 hours. Duration 1-2 days.
3. Symptoms-nausea, vomiting, cramps, diarrhea, no fever
4. Source- nose, throat, skin (cuts, sores, pimples, burns), hands.
5. Aerobic.
6. Shape- cocci in grape- like clusters, non-spore forming.
7. Foods implicated- moist, much handled, high protein food as meat pies, potato salads, gravies and turkey stuffing.
8. Heat stable toxin.

B. Salmonella infection

1. Onset time 6-48 hours. Duration 2 to 3 days.
2. Symptoms- abdominal pain, diarrhea, fever, vomiting.
3. Source- intestines of humans and animals. Feces.
4. Facultative
5. Shape- non-spore forming, rod
6. Foods implicated- meats, poultry, gravies, sauces, egg products, unpasteurized dairy products.

C. Clostridium perfringens intoxication.

1. 80% of population are carriers
2. Onset time 8-22 hours. Duration up to 24 hours.
3. Symptoms- acute abdominal pain, diarrhea, inflammation of stomach and intestines, dehydration.
4. Source- soil, dust and intestinal track of animals.
5. Anaerobic.
6. Shape- rod shaped, heat resistant spore formers.
7. Foods implicated- meat and poultry left to cool slowly or in danger zone too long. Raw vegetables- be sure to wash them before use.

D. Clostridium botulinum intoxication.

1. Onset time 12-36 hours; high fatality rate 50-65%
2. Symptoms- progressive respiratory paralysis, double vision, headache and vomiting.
3. Source- soil, mud, water and intestine of animals.
4. Anaerobic
5. Shape- heat resistant spores, produces a toxin and is a rod. Boil foods for 20 minutes thoroughly.
6. Foods implicated- improperly canned, low acid foods (beans, corns, olives and mushrooms).

E. Streptococcal infection.

1. Onset and duration 1-3 days.
2. Symptoms- high fever, septic sore throat, scarlet fever and tonsillitis.
3. Source- nose; throat and lesions discharges
4. Aerobic
5. Shape- cocci in chain-like structure, non- spore forming.
6. Foods implicated- milk, ice cream, eggs, potato and egg salad

F. Bacillus cerus intoxication.

1. Onset time 8 to 16 hours. Duration 12 hours or less.
2. Symptoms- diarrhea, abdominal pain, nausea, vomiting
3. Source- soil, water and dust.
4. Facultative.
5. Shape- rod shape, spore-former.
6. Foods implicated- rice and rice dishes, meat products, grains, dry-mix food (potatoes, soups, gravies)

G. Shigellosis infection

1. Onset time 24hours to 7 days. Duration- several days/ indefinite
2. Symptoms- diarrhea, cramps, chills, dehydration, fever, bloody stools.

3. Source- man, higher primates.
4. Facultative
5. Shape- rod shape, non-spore former.
6. Foods implicated- beans, salads, turkey, fish, spaghetti, shrimp, clams, shellfish, and meats.

H. Viral infection. Infectious Hepatitis A.

1. Onset time- 10-50 days. Duration-1-2 weeks/ several months.
2. Symptoms- jaundice, nausea, abdominal pain, malaise, fever.
3. Source- human feces urine, shellfish, polluted water.
4. Foods implicated- raw oysters and shellfish, milk, glazed donuts, orange juice, sliced meat.

I. Norwalk Virus

1. Onset time -24-48 hours. Duration- 3 to 10 days.
2. Symptoms- nausea, diarrhea, abdominal pain, fever.
3. Source- man, human feces.
4. Foods implicated- raw vegetables, clams.

RELEASE SPECIMEN

GIARDIA:

**3 NEG. 24 HOURS AFTER ANTIBIOTIC
48 HOURS APART**

SALMONELLA:

**2 NEG. 48 HOURS AFTER ANTIBIOTIC
24 HOURS APART**

**ENTERIC E. COLI (0157:H7; ENTEROHEMORRHAGIC,
ENTEROTOXIGENIC & ENTEROPATHOGENIC):
2 NEG. 48 HOURS AFTER ANTIBIOTIC
24 HOURS APART.**

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