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Campylobacteriosis

Overview^{2, 3, 5, 7, 12, 13}

Campylobacteriosis is one of the most common causes of diarrheal illness in the United States. *Campylobacter* refers to a group of bacteria that are commonly found in the intestines of animals, both domestic (chickens, cattle, sheep, swine, hamsters, kittens, puppies, etc.) and wild (water fowl, rodents, etc.). There are 21 *Campylobacter* species; however *Campylobacter jejuni* and *Campylobacter coli* are the two species that most often infect humans, causing an illness called campylobacteriosis. Campylobacteriosis can affect anyone; however the infection is more common in children under five years of age and young adults. The symptoms are often more severe in the elderly and people with other medical conditions.

A person becomes infected from eating or drinking contaminated food, water, unpasteurized or raw dairy or from close contact with infected animals or by direct or indirect contact with contaminated feces from an infected animal or person (especially young children). While the bacteria can exist in the intestinal tracts of people and animals without causing any symptoms or illness, studies show that consuming as few as 500 *Campylobacter* bacteria can cause illness.

Symptoms of campylobacteriosis, which usually occur within 2 to 10 days after the bacteria are ingested include: diarrhea (frequently bloody), abdominal pain, cramping, fever, and occasionally nausea and vomiting. In neonates, bloody diarrhea may be the only symptom. Abdominal pain caused by campylobacteriosis may mimic acute appendicitis or inflammatory bowel disease. Most people who get campylobacteriosis recover completely within 2 to 5 days, although sometimes recovery can take up to 10 days. Bacteremia is uncommon but can occur in children, including neonates. Ten to twenty percent of patients have a relapse or a prolonged or severe illness. In very rare instances, post-infection complications include reactive arthritis, febrile convulsions, or Guillain-Barre syndrome (an acute febrile polyneuritis).

Infected individuals may shed *Campylobacter* bacteria in the feces for 2-3 weeks. Almost all persons infected with *Campylobacter* recover without any specific treatment. Patients should drink extra fluids as long as the diarrhea lasts. Antimicrobial therapy is warranted only for patients with severe disease or those at high risk for severe disease, such as those with immune systems severely weakened from medications or other illnesses. Following infection, temporary immunity often develops.

For a complete description of campylobacteriosis, please refer to the following texts:

- *Control of Communicable Diseases Manual (CCDM)*, American Public Health Association, 19th ed; 2008.
- American Academy of Pediatrics. *Red Book: 2012 Report of the Committee on Infectious Diseases*. 29th ed; 2012.
- Mandell GL, Bennett JE, Dolin RD, eds. *Mandell, Douglas, and Bennett's Principles and Practices of Infectious Diseases: Vol. 2*. 7th ed; 2010.



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2015 Case Definition – Campylobacteriosis (*Campylobacter* spp.)⁴ – (3/15)

Clinical Criteria

An illness of variable severity commonly manifested by diarrhea, abdominal pain, nausea and sometimes vomiting. The organism may also rarely cause extra-intestinal infections such as bacteremia, meningitis or other focal infections.

Laboratory Criteria for Diagnosis

Probable: Detection of *Campylobacter* spp. in a clinical specimen using a culture independent diagnostic test (CIDT).

Confirmed: Isolation of *Campylobacter* spp. from a clinical specimen.

Epidemiologic Linkage

Probable: A clinically compatible case that is epidemiologically linked to a case that meets the probable or confirmed laboratory criteria for diagnosis.

Criteria to Distinguish a New Case from an Existing Case

A case should not be counted as a new case if laboratory results were reported within 30 days of a previously reported infection in the same individual.

Case Classification

Probable: A case that meets the probable laboratory criteria for diagnosis or a clinically compatible case that is epidemiologically linked to a probable or confirmed case of campylobacteriosis.

Confirmed: A case that meets the confirmed laboratory criteria for diagnosis.

Comment(s): The use of CIDTs as stand-alone tests for the direct detection of *Campylobacter* in stool is increasing. Data regarding their performance indicate variability in the sensitivity, specificity, and positive predictive value of these assays depending on the manufacturer (CDC unpublished data). It is therefore useful to collect information on the laboratory conducting the testing using the laboratory's unique Clinical Laboratory Improvement Amendments (CLIA) number, and when possible, type and manufacturer of the CIDT used to diagnose each case. Culture confirmation of CIDT-positive specimens is ideal, but not practical to achieve in most jurisdictions.

Information Needed for Investigation

Verify the diagnosis. What laboratory tests were conducted and what were the results? Obtain demographic, clinical and laboratory information on the case from the attending physician, hospital, and/or laboratory. Obtain the other epidemiological information necessary to complete the [Disease Case Report](#) (CD-1) and the [Record of Investigation of Enteric Illness](#) (CD-2C) from the patient or a knowledgeable family member.

Establish the extent of illness. Have there been other cases linked by time, place or person? Ask about illnesses among household, child care, hospital or long-term care, sexual and other contacts. Determine if the case provided child or patient care, or prepared food for anyone outside the

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household while symptomatic. Ask if the case lived or spent significant time in another household. If ill persons are identified, advise them to contact their medical provider. **NOTE:** *Campylobacter fetus* predominantly causes systemic illness in neonates and debilitated hosts.

Identifying the source of infection. The information obtained from the public health investigation will be used to help identify the source.

- Does the case or a member of the case’s household attend a child care center or nursery school?
- Does the case or a member of the case’s household work as a food handler or health care provider?
- Does the case handle animals or otherwise have contact with feces from wild or domestic animals?
- What is the case’s primary source of drinking water?
- Has the case ingested untreated water from a lake or stream?
- Did the case eat raw or undercooked poultry?
- Has the case traveled recently?
- Has the case consumed unpasteurized dairy products?
- Have there been other cases linked by time, place or person?
- Is this case related to a food recall?

NOTES: Person-to-person spread of campylobacteriosis occasionally occurs, particularly in very young children. While outbreaks of diarrhea in child care centers have been reported, they appear to be uncommon.² Sometimes the source cannot be identified.

Provide *Campylobacter* information to persons at risk for infection and the general public as needed. Efforts should be made to promote *Campylobacter* awareness and provide prevention information to the public to reduce the risk of campylobacteriosis. Cases should be educated on the importance of personal hygiene, particularly after using the toilet and before and after food handling. Information on campylobacteriosis prevention can be found on CDC’s website at: <http://www.cdc.gov/nczved/divisions/dfbmd/diseases/campylobacter/#prevent> or;

The United States Department of Agriculture (USDA) website at:

<http://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/foodborne-illness-and-disease/campylobacter-questions-and-answers/> or;

The Center for Food Security and Public Health, Iowa State University, College of Veterinary Medicine website at: http://www.cfsph.iastate.edu/FastFacts/pdfs/campylobacteriosis_F.pdf.

Contaminated food and water often pose a risk for travelers; see CDC’s website Travelers’ Health, *Yellow Book, Food and Water Precautions* at:

<http://wwwnc.cdc.gov/travel/yellowbook/2014/chapter-2-the-pre-travel-consultation/food-and-water-precautions>.

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Campylobacter Surveillance. Review WebSurv to determine whether there have been other campylobacteriosis cases. When cases are related by person, place or time and serotype, efforts should be made to identify a common source. Information obtained through the public health investigation will be used to identify a possible source of infection and to characterize persons or geographic areas in which additional efforts are needed to raise awareness and reduce disease incidence. When investigating a suspected outbreak of gastrointestinal illness of unknown etiology, see the [Outbreak Investigation](#) section of this manual.

Notification

Immediately contact the [District Communicable Disease Coordinator](#), or the [Senior Epidemiology Specialist for the District](#), or the Missouri Department of Health and Senior Services (MDHSS) - BCDCP, phone (573) 751-6113, Fax (573) 526-0235, or for afterhours notification contact the MDHSS/ERC at (800) 392-0272 (24/7) if an outbreak* of campylobacteriosis is suspected. If the case is in a high-risk setting or job such as food handling, child care or healthcare, contact the [District Communicable Disease Coordinator](#) and the appropriate organization below:

- If a case(s) is a food handler, BCDCP or the LPHA will contact the Bureau of Environmental Health Services (BEHS), phone (573) 751-6095, Fax (573) 526-7377.
- If a case(s) is associated with a child care center, BCDCP or the local public health agency (LPHA) will contact the BEHS, phone (573) 751-6095, Fax (573) 526-7377 and the Section for Child Care Regulation, phone (573) 751-2450, Fax (573) 526-5345.
- If a case(s) is associated with a long-term care facility, BCDCP or the LPHA will contact the Section for Long Term Care Regulation, phone (573) 526-8524, Fax (573) 751-8493.
- If a case is associated with a hospital, hospital-based long-term care facility, or ambulatory surgical center BCDCP or the LPHA will contact the Bureau of Health Services Regulation phone (573) 751-6303, Fax (573) 526-3621.
- Contact the Department of Natural Resources, Public Drinking Water Branch, at (573) 751-1187, Fax (573) 751-3110 if cases are associated with a public water supply, or BEHS, phone (573) 751-6095, Fax (573) 526-7377, if cases are associated with a private water supply.

*Outbreak is defined as the occurrence in a community or region, illness(es) similar in nature, clearly in excess of normal expectancy and derived from a common or a propagated source.

Control Measures^{2, 5, 6, 7, 8, 9, 12, 13}

General

Currently, there is no vaccine to prevent campylobacteriosis. The best defense against campylobacteriosis is thorough, frequent handwashing and proper cooking, handling and storage of food. Therefore you should:

NOT: Prepare Food or Pour Beverages for others while ill with diarrhea.

Campylobacteriosis cases and ill contacts should be excluded from food handling, the care of children or patients, and other occupations that pose significant risk of transmission until after the diarrhea has ceased.



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CLEAN: Wash Hands and Surfaces Often.

- Wash your hands with warm soapy water for 20 seconds before, during and after handling food and after using the bathroom, changing diapers, and handling pets.
- Wash hands with soap and warm water after handling raw foods of animal origin and before touching anything else.
- Always wash your hands with soap and warm water before touching a baby (for example, to feed or change their diaper), especially after you have touched any pets or uncooked poultry or meat.
- Keep pets away from food storage and preparation areas. Wash your hands well with soap and water after handling pet treats, pet food and pet toys, or after playing with or cleaning up after your pet.
- Supervise handwashing of toddlers and small children after they use the toilet.
- Wash utensils, cutting boards, dishes, and countertops with hot soapy water after preparing each food item and before you go on to the next item.
- Wash raw fruits and vegetables thoroughly with clean, safe running water before you prepare and eat them.
- Consider using paper towels to clean kitchen surfaces. If you use cloth towels, wash them often in the hot cycle of your washing machine.

SEPARATE: Don't Cross-contaminate.

- When buying, storing, preparing and serving foods, keep raw meats separate from fruits, vegetables, cooked foods and ready-to-eat foods.
- If possible, use one cutting board for fresh produce and a separate one for raw meat, poultry, and seafood.
- Always wash cutting boards, dishes, countertops, and utensils with hot soapy water after they come in contact with raw meat, poultry, and seafood.
- Never place cooked food on a plate which previously held raw meat, poultry, or seafood.
- Place raw meat, poultry and seafood in containers on the bottom shelf of the refrigerator. Use containers that are large enough to prevent raw juices from dripping onto other food or touching other food.

COOK: Cook to Safe Temperatures.

Use a clean food thermometer when measuring the internal temperature of meat, poultry, casseroles, and other foods to make sure they have reached a safe minimum internal temperature.

- Bacteria can grow in the danger zone between 41°F to 135°F. Keep cold foods cold at or below 41°F and keep hot foods hot at or above 135°F.
- Cook raw beef, pork, lamb and veal steaks, chops, and roasts to a minimum internal temperature of 145°F as measured with a food thermometer before removing meat from the heat source. For safety and quality, allow meat to rest for at least three minutes before carving or consuming. For reasons of personal preference, consumers may choose to cook meat to higher temperatures.



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- Cook raw ground beef, pork, lamb, and veal to an internal temperature of 155°F as measured with a food thermometer.
- Cook poultry to a safe minimum internal temperature of 165°F as measured with a food thermometer.
- For optimum safety, cook stuffing separately to 165°F.
- Fish should reach 145°F as measured with a food thermometer.
- Bring sauces, soups, and gravy to a boil when reheating.
- Reheat leftovers thoroughly to at least 165°F.

In addition, don't eat or drink foods that have uncooked eggs or raw (unpasteurized) dairy in them.

CHILL: Refrigerate Promptly.

Keep food safe at home, refrigerate promptly and properly. Refrigerate or freeze perishables, prepared foods, and leftovers within 2 hours — 1 hour if the temperature is above 90°F.

- Freeze or consume leftovers within four days of cooking. Always reheat leftovers to at least 165°F before eating.
- Freezers should register 0°F or below and refrigerators 41°F or below. Install a thermometer in your freezer and fridge to be sure.
- Thaw food in the refrigerator, in cold water, or in the microwave. Foods should not be thawed at room temperature. Foods thawed in the microwave or in cold water must be cooked to a safe minimum internal temperature before refrigerating.
- Marinate foods in the refrigerator.
- Eat and drink only pasteurized juice, cider, milk and milk products. Mothers' milk is the safest food for infants.
- Only buy clean uncracked eggs and shellfish from reputable sources. Store eggs in their original carton (so you can check the "best before" date) and place them in the coldest section of the fridge, not the door.
- Cooling shall be accomplished in accordance with the time and temperature criteria specified under [§ 3-501.14](#) by using one or more of the following methods based on the type of food being cooled:
 - 1) Placing the food in shallow pans; or separating the food into smaller or thinner portions before placement into refrigeration;
 - 2) Using rapid cooling equipment;
 - 3) Stirring the food in a container placed in an ice water bath before placement into refrigeration;
 - 4) Using containers that facilitate heat transfer before placement into refrigeration;
 - 5) Adding ice as an ingredient before placement into refrigeration; or
 - 6) Other effective methods.
- Don't pack the refrigerator. Cool air must circulate to keep food safe.



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TRAVELERS: should follow CDC’s [food and water precautions](#).

- Drink water from a safe supply.
- If you are in a restaurant, send back all undercooked meat, poultry or eggs to the kitchen and have them cook it longer.

WATER: Drinking and Recreational.

- If coliform bacteria are detected in a private water supply (e.g., cistern, well), advise the family to boil the water (bring water to a full rolling boil for one minute) used for drinking, food preparation, dishwashing, and tooth brushing until the problem in the water supply can be corrected.
- If cases are associated with a public water supply, notify the [District Communicable Disease Coordinator](#), who will notify the Department of Natural Resources (DNR). If possible, DNR should be contacted before the collection of any public water samples.
- Avoid swallowing water from ponds, lakes, or untreated pools. For cases associated with recreational water activities or with private drinking water contact the [District Communicable Disease Coordinator](#).
- Infected persons should refrain from recreational water venues (e.g., swimming pools, water parks) for 2 weeks after symptoms resolve.⁵

If you are diagnosed with campylobacteriosis, be sure that you or your health care provider informs the local Public Health Department. If several cases occur at the same time, it may mean that a restaurant or a particular food item has a problem that needs to be corrected.

TREATMENT: Almost all persons infected with *Campylobacter* recover without any specific treatment. Antimicrobial therapy is warranted only for patients with severe disease or those at high risk for severe disease, such as those with immune systems severely weakened from medications or other illnesses.⁵ Rehydration is the mainstay for all children with diarrhea. Azithromycin and erythromycin shorten the duration of illness and excretion of organisms and prevent relapse when given early in gastrointestinal tract infections.²

Food Handler

Educate all food handlers about the importance of handwashing before, during and after food preparation, refrigerate prepared foods in small containers, thoroughly cook all foodstuffs derived from animal sources, avoid recontamination within the kitchen after cooking is complete, and maintain a sanitary kitchen and protect foods against rodent and insect contamination.

Food handlers with vomiting or diarrhea should be excluded until asymptomatic for at least 24 hours.

Missouri Food Code for the Food Establishments of the State of Missouri - June 3, 2013.

2-201.12 Exclusions and Reinstatement.

- (A) A food employee symptomatic with:
- (1) Vomiting^P or diarrhea^P shall be:



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- (a) Excluded by the person in charge, *except when the symptom is from a noninfectious condition^P*; and
- (b) Reinstated by the person in charge, if the food employee:
 - (i) Is asymptomatic for at least twenty-four (24) hours^P; or
 - (ii) Provides to the person in charge written medical documentation from a health practitioner that states the symptom is from a noninfectious condition^P.

^P = Priority item: an item that requires the incorporation of specific actions, equipment or procedures to attain control of risk factors that contribute to foodborne illness or injury such as personnel training, infrastructure or necessary equipment, HACCP plans, documentation or record keeping, and labeling. **NOTE:** For additional measures for the “Control of Communicable, Environmental and Occupational Diseases” see [19 CSR 20-22.040](#) and [19 CSR 20-20.060](#) “Control Measures for Food Handler”.

- For individuals with questionable hygiene, they may return to work when symptoms resolve, but should be reassigned to other duties (non-food handling) until they can be trained, and are likely to follow good hygienic measures.

Health Care Worker

Health care workers (HCWs) should be excluded from care of patients until after the diarrhea has ceased for 24 hours. HCWs that are asymptomatic need not be excluded from work if proper personal hygiene measures, including hand hygiene are maintained.²

School

Exclude symptomatic children and teachers from schools until diarrhea stops. Stress proper handwashing.

Child Care

Increased surveillance within the child care facility to identify others with diarrheal illness is important. Child care staff with diarrhea should be excluded from the facility until after the diarrhea has ceased for 24 hours. Infants and children in diapers with diarrhea should be excluded from the facility until after the diarrhea has ceased for 24 hours or may be cared for in a separate protected area until diarrhea has subsided. Antibiotic treatment (e.g., azithromycin or erythromycin) may further limit the potential for transmission.²

- Emphasize handwashing to all staff and children because good hand hygiene is the best preventive measure. Supervised handwashing after visiting the bathroom and before eating is essential for all children. Waterless hand sanitizers may also be helpful as an adjunct to washing hands with soap and warm water.
- Employees handling food in child care settings should follow the criteria listed above in the [Missouri Food Code](#).
- Staff that prepares food should not change diapers, or assist children in using the toilet.

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- If a child in diapers has campylobacteriosis, everyone who changes the child’s diapers should be sure the diapers are disposed of properly in a closed-lid garbage can and should wash his or her hands and the child’s hands carefully with soap and warm water immediately after changing the diaper. After use, the diaper changing area should be wiped down with a disinfectant such as diluted household bleach, Lysol or bactericidal wipes.
- Other surfaces and objects should be decontaminated regularly; daily during an outbreak of campylobacteriosis.
- If several cases occur in a child care center, the local public health agency should coordinate efforts to improve handwashing among the staff, children, and their families. Contact the [Section for Child Care Regulation](#) for an Environmental Public Health Specialist to perform an assessment of the child care facility. The inspection should include emphasis on the items listed in [“Day Care Establishment Inspection Related to Enteric Infection” \(CD-8\)](#).
- Access to shared water-play areas and dirty diapers should be eliminated.

To prevent the spread of infection, efforts should be made to avoid the transfer of children to other child care centers. Closure of affected child care centers may lead to placement of infected children in other centers (with subsequent transmission in those centers) and is counterproductive.

Laboratory Procedures

Clinical Specimens: Collect stool specimens in Cary-Blair media using the Enteric Specimen collection kit supplied by the Missouri State Public Health Laboratory (MSPHL).

Specimens should be shipped chilled. Diagnosis is based on culture of the organism.

NOTE: Raw stool specimens will only be accepted from city or county health departments, unless there are special circumstances and previous approval has been obtained. The MSPHL does not test any other types of clinical specimens for enteric pathogens. The MSPHL does not perform culture independent diagnostic test (CIDT). Private laboratories do this testing and would have procedures for submitting specimens. **NOTE:** Data regarding the performance of CIDT indicate variability in the sensitivity, specificity, and positive predictive value of these assays depending on the manufacturer. Culture confirmation of CIDT-positive specimens is ideal, but may not be practical to achieve. **COMMENT:** When investigating diarrheal illness of unknown etiology specimens should be initially screened for *Salmonella*, *Shigella*, *Campylobacter*, and Shiga toxin-producing *E. coli* (STEC).

Food Samples: Food samples can be sent chilled to the MSPHL to be tested for *Campylobacter* as part of an epidemiological investigation. Samples are to be collected and submitted by an official of the local public health agency or state health office. Samples should be collected in their final **intact package** for testing. If an intact sample of a product is too large to submit to the lab, submit a sterile sample container with at least four ounces of the product to be tested. Please contact the District Environmental Public Health Specialist and [District Communicable Disease Coordinator](#), or the [Senior Epidemiology Specialist for the District](#) prior to submitting



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food samples. The Environmental Bacteriology Unit at the MSPHL should be consulted prior to collection of specimens. For additional information concerning food sample collection or food sample transport visit the MSPHL website at: <http://health.mo.gov/lab/foodtesting.php> or call the MSPHL - Environmental Bacteriology Unit at (573) 751-3334.

Reporting Requirements

Campylobacteriosis is a Category 3 reportable disease and shall be reported to the local health authority or to the Missouri Department of Health and Senior Services (MDHSS) within three (3) days of first knowledge or suspicion, by telephone, facsimile, or other rapid communication.

As a Nationally Notifiable Condition, confirmed and probable cases are a **STANDARD** report to the CDC. **STANDARD** reporting requires the MDHSS to report to CDC by electronic transmission via WebSurv within the next normal reporting cycle.

1. For confirmed and probable cases, complete a “[Disease Case Report](#)” (CD-1) and a “[Record of Investigation of Enteric Illness](#)” (CD-2C).
2. Entry of the completed Disease Case Report and Record of Investigation of Enteric Illness form into WebSurv negates the need for the forms to be forwarded to the District Health Office.
3. MDHSS will report to CDC following the above reporting criteria (see box).
4. All outbreaks or “suspected” outbreaks must be reported as soon as possible (by phone, fax, or e-mail) to the [Communicable Disease Coordinator](#) or the [Senior Epidemiology Specialist](#) for the District. This can be accomplished by completing the [Missouri Outbreak Surveillance Report](#) (CD-51).
5. If an outbreak is associated with food, person-to-person transmission, environmental contamination, animal contact, or indeterminate/other/unknown etiology, a CDC 52.13 form ([National Outbreak Reporting System – Foodborne Disease Transmission, Person-to-Person Disease Transmission, Animal Contact](#)) is to be completed and submitted to the District Communicable Disease Coordinator at the conclusion of the outbreak.
6. If an outbreak is associated with the consumption or use of water for drinking, or with ingestion, contact, or inhalation of recreational water, a CDC 52.12 form ([National Outbreak Reporting System - Waterborne Disease Transmission](#)) is to be completed and submitted to the District Communicable Disease Coordinator at the conclusion of the outbreak.
7. Within 90 days from the conclusion of an outbreak, submit the final outbreak report to the District Communicable Disease Coordinator.

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