



# Campylobacter

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## Disease Plan

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Questions about this disease plan?

Contact the Utah Department of Health Bureau of Epidemiology: 801-538-6191.

## ✓ WHY IS CAMPYLOBACTER IMPORTANT TO PUBLIC HEALTH?

Enteric disease illnesses resulting in diarrhea, including *Campylobacter*, are still a leading cause of death in the world. The CDC estimates that one in six Americans becomes ill with some sort of foodborne illness every year which results in over 200,000 hospitalizations and 3,000 deaths. *Campylobacter* is important to public health because of its potential for large outbreaks and, though rare, severe illness. Raw, unpasteurized milk and cheese products have been the source of *Campylobacter* outbreaks in Utah over the last five years, as well as exposure to baby chicks and raw chicken. There are simple measures such as hand washing and consuming pasteurized milk products that can prevent the majority of outbreaks. *Campylobacter* is the enteric disease most frequently reported each year in Utah.

## ✓ DISEASE AND EPIDEMIOLOGY

### **Clinical Description**

The most common symptoms of campylobacteriosis are diarrhea (sometimes bloody), abdominal pain, malaise, fever, nausea, and sometimes vomiting. Infection can cause a spectrum of diseases ranging from mild, uncomplicated gastroenteritis to fulminant disease similar to acute appendicitis. Asymptomatic infections also occur. The illness is usually over within a week, but may be prolonged in some individuals and can sometimes relapse. For a more detailed description, see the table on the next page.

In adults, acute illness is characterized by the following **symptoms:**

Symptom	Description
None	Although rare, asymptomatic infection can occur.
Abdominal Pain	Often severe, can mimic appendicitis, occurs in the periumbilical region.
Diarrhea	Defined as 3 or more loose stools per day; 10 bowel movements per day for 7 days common; usually self-limited (no medication required). An adult may lose in excess of 5kg during illness.
Bloody Diarrhea	Occurs after 2 or 3 days of non-bloody diarrhea in 10-15% of cases.
Nausea	Very common.
Vomiting	Occurs in 15-25% of cases.
Fever	May be high and can trigger: rigors, aches, dizziness, delirium. *Usually will occur 1-2 days prior to GI Symptom onset. Cases with fever usually have a more severe illness and can be invasive. Bacteremia occurs in 0.1 to 1% of cases.
<b>Special Populations</b>	
Children	<b>Fever</b> is more pronounced in children under the age of one year; convulsions may occur. <b>Bloody diarrhea</b> is more common in children than adults (about 50% of cases will experience bloody stools). <b>Seizure</b> is also a complication that can be caused by <i>Campylobacter</i> . One raw milk associated outbreak affected 2,500 children, 9 of whom were hospitalized with grand mal seizures.
Infants	<b>Vomiting</b> and <b>bloody diarrhea</b> are most common, with fewer infants experiencing <b>abdominal pain</b> and <b>fever</b> than other age groups.
Neonates	Grossly <b>bloody</b> stools and <b>fever</b> are typically the only symptoms associated with neonates. There have been documented nosocomial infections in neonate nurseries.
Immunocompromised	Long term carriage may occur, illness is often more severe.
<b>Post-Diarrheal Complications</b>	
Guillain-Barre Syndrome (GBS)	GBS is a severe illness that causes paralysis and other neurological symptoms. It is a rare complication and occurs at a rate of 1 case of GBS per 1,000 cases of <i>Campylobacter</i> . GBS may occur up to 60 days after diarrhea has stopped. <i>Campylobacter</i> is a known trigger for GBS and may be associated with up to 40% of GBS cases in the U.S.
Reactive Arthritis	Occurs in less than 2.5% of cases, but is similar to reactive arthritis brought on by other bacterial infections.
Other	Bacteremia, sepsis, cholecystitis, peritonitis, rash, pericarditis, myocarditis, septic arthritis, bursitis, osteitis, and wound infection.

## Causative Agent



Campylobacteriosis is caused by motile, gram negative bacteria of the genus *Campylobacter*. *Campylobacter* was not recognized until the 1980's as an agent of foodborne illness. It is similar to helicobacters and arcobacters. These organisms colonize the surface of the mucous membranes in the GI tract. The spiral shape and long flagella allow the *Campylobacter* organism to move rapidly and screw itself into the epithelial cells of the intestinal tract. Most human illness is caused by one species, *Campylobacter jejuni*.

## Differential Diagnosis

*Salmonella*, *E. coli* O157:H7, *Shigella*, *Yersinia enterocolitica*, and bacterial food poisoning may show similar signs and symptoms.

<https://online.epocrates.com/u/29351175/Campylobacter+infection/Diagnosis/Differential>

## Laboratory Identification

Stool culture is the preferred method for *Campylobacter* diagnosis. EIA and PCR techniques are also acceptable. Rapid identification can be made by darkfield or phase-contrast microscopy, although the sensitivity of these techniques is low. Microscopy can be useful in making a presumptive diagnosis, but should always be confirmed with stool culturing.

**UPHL:** The Utah Public Health Laboratory (UPHL) accepts stool specimens for isolation, isolates in broth, or other clinical specimen if a culture-independent diagnostic test (CIDT) was performed. All positive samples submitted to UPHL will be serotyped and a PFGE analysis performed.

## Treatment

Treatment is not recommended for *Campylobacter* infection because the symptoms are usually self-limited and resolve after about a week. Hydration and rest are effective methods of

treatment for most mild cases. Severe illness may require antibiotic treatment; the recommended medications are azithromycin, levofloxacin, or ciprofloxacin.

## Case Fatality

Death from campylobacteriosis is rare, with a mortality rate of between .01% and 1.0%. Deaths are usually attributed to another co-morbidity.

## Reservoir

*Campylobacter* is ubiquitous in the environment and generally lives in the GI tracts of animals. Notable animal reservoirs are poultry, cattle, wild birds, puppies, and kittens. Approximately 70% of all commercially produced chicken for consumption is contaminated with *Campylobacter* in the U.S.

## Transmission

*Campylobacter* is an enteric disease that is primarily transmitted through ingestion of food, milk, or water that has been contaminated. It can be transmitted person-to-person through the fecal-oral route. Foreign travel, direct animal contact, undercooked meat, and swimming in contaminated water are other modes of transmission.

### Common risk factors reported by *Campylobacter* cases in Utah, 2009-2014

(n=2197)

Risk Factor	%	Risk Factor Notes
Raw Milk Exposure	10%	Unpasteurized milk. Usually consumed 2-4 days prior to onset.
Suspect Meat Exposure	10%	Chicken is often heavily contaminated with <i>Campylobacter</i> from processing. Avoid cross contamination with cutlery.
Animal Exposure	20%	Utah is rural and animal contact is common. Livestock, live poultry, cows, horses, puppies and kittens can have the bacteria.
Suspect Water Exposure	10%	<i>Campylobacter</i> can live and grow in natural water sources, lakes and springs.
Immunocompromised	5%	Cases with HIV/AIDS, cancer, rheumatoid arthritis, or recently undergone a transplant.
Foreign Travel	10%	Often called "Traveler's Diarrhea" when contracted in a foreign country.
Out of State Travel	5%	If the case was out of the state for the entire exposure period, their exposure was designated as "Out of State."
Other	5%	Anything that was mentioned in the interview that is not typically listed as a high risk exposure.
Unknown	10%	No high-risk factors were noted during the investigation.
Lost to Follow-up	15%	Over a five-year period from 2009-2014, an average of 85% of cases were contacted.

## **Susceptibility**

All people are susceptible. Immunity to serologically-related strains may build over time. In developing countries, most persons are immune by the age of two years. An estimated 5% of cases relapse. The most susceptible people include those who are immunocompromised, pregnant, less than five years of age, or male.

## **Incubation Period**

The incubation period for *Campylobacter* may range from 1-10 days, with most symptoms starting 2-5 days after exposure to the bacteria. *Campylobacter* has a dose response; the more bacteria ingested, the shorter the incubation time will be.

## **Period of Communicability**

*Campylobacter* is communicable for as long as the infected person sheds or excretes *Campylobacter* in their stool. This period can range from several days to several weeks, with an average of one month from the first onset of symptoms. Persons with immunocompromising conditions or medications tend to shed the bacteria for a longer period of time.

## **Epidemiology**

*Campylobacter* causes 5-14% of diarrhea worldwide and is the most common bacterial cause of diarrheal illness in the U.S. It is estimated that 1.3 million cases occur in the U.S. annually, with almost all cases occurring as isolated, sporadic events. Children and young adults have the highest incidence of infection. Approximately, 10% more males contract *Campylobacter* in Utah than females. Infections tend to occur mostly during the warmer months. Over the past five years in Utah, an average of 386 cases of *Campylobacter* has been reported annually. The most recent outbreak in Utah involved 100 cases and was associated with unpasteurized milk. Through public health efforts and partnerships with local health departments, environmental health, and the Utah Department of Agriculture, the implicated dairy is no longer allowed to sell raw milk.

## ✓ PUBLIC HEALTH CONTROL MEASURES

### Public Health Responsibility

- Investigate all suspect cases of disease, complete and submit appropriate disease investigation forms.
- Provide education to the general public, clinicians and first responders regarding disease transmission and prevention.
- Identify clusters or outbreaks of this disease, and determine the source.
- Identify cases and sources to prevent further transmission.

### Prevention

#### Environmental Measures

Implicated food items must be removed from consumption. A decision about testing implicated food items can be made in consultation with the Enteric Diseases Epidemiologist at the Utah Department of Health (UDOH) and UPHL.

The general policy of UPHL is to test only food samples implicated in suspected outbreaks, not in single cases (except when botulism is suspected). If holders of food implicated in single case incidents would like their food tested, they may be referred to a private laboratory that will test food, or asked to store the food in their freezer for a period of time in case additional reports are received. However, in certain circumstances, a single, confirmed case with leftover food that had been consumed within the incubation period may be considered for testing.

#### Personal Preventive Measures/Education

To avoid exposure to *Campylobacter*, persons should:

- Always wash their hands thoroughly with soap and water before eating or preparing food, after using the toilet, after changing diapers and after touching their pets or other animals.
- Wash their own hands, as well as the child's hands after changing a child's diaper.
- In a childcare setting, dispose of diapers in a closed-lid garbage can.
- Wash hands thoroughly and frequently when ill with diarrhea, or when caring for someone with diarrhea.
- Hands should be scrubbed for at least 15–20 seconds after cleaning the bathroom, after using the toilet or helping someone use the toilet, after changing diapers, before handling food and before eating.
- Keep food that will be eaten raw, such as vegetables, from becoming contaminated by animal-derived food products.
- Avoid letting infants or young children come into contact with pets that are sick with diarrhea, especially puppies and kittens.

- Make sure to cook all food products from animals thoroughly, especially poultry products (165° F), and avoid consuming raw eggs or cracked eggs, unpasteurized milk, or other unpasteurized dairy products.
- Discuss transmission risks that may result from oral-anal sexual contact. Latex barrier protection (e.g., dental dam) may prevent the spread of campylobacteriosis to a case's sexual partner(s), and may prevent exposure to and transmission of other fecal-oral pathogens.

## **Chemoprophylaxis**

None.

## **Vaccine**

None.

## **Isolation and Quarantine Requirements**

**Isolation:** Food handlers with campylobacteriosis must be excluded from work until diarrhea has resolved.

**NOTE:** A food handler is any person directly preparing or handling food. This can include a patient care or childcare provider.

**Hospital:** Enteric precautions.

**Quarantine:** Contacts who have diarrhea and are food handling facility employees shall be considered the same as a case and shall be handled in the same fashion. No restrictions otherwise.

**NOTE:** In certain circumstances, cases, ill contacts, and/or asymptomatic contacts who are food handlers may be required to have negative stool samples prior to returning to work. The local health department will decide which cases and/or contacts will need negative stool samples prior to returning to work, and whether one or two negative samples is necessary. If a case or contact has been treated with an antimicrobial agent, the stool specimen should not be collected until at least 48 hours after cessation of therapy. If two negative stool samples are determined to be necessary, the samples should be taken at least 24 hours apart.

## ✓ CASE INVESTIGATION

### Reporting

All cases of campylobacteriosis should be reported to public health. All primary cases should have an attempted interview. UPHL should receive all positive samples for further testing. *Campylobacter* is now a Nationally Notifiable Disease.

### Case Definition

#### Clinical description

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

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

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

#### Case classification

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

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

OR

*Probable:* A clinically compatible case with detection of *Campylobacter* spp. in a clinical specimen using CIDT.

Criterion	Confirmed	Probable (Laboratory Evidence)	Probable (Epi-Linked)
<b>Clinical Evidence</b>			
Diarrhea	O	O	O
Abdominal Cramping	O	O	O
Nausea	O	O	O
Vomiting	O	O	O
Febrile bacteremia	O		O
Meningitis	O		O
Focal infection	O		O
Healthcare record contains a diagnosis of campylobacteriosis			O
Death certificate containing campylobacteriosis as a contributing or underlying cause of death			O
<b>Laboratory Evidence</b>			
Detection of <i>Campylobacter</i> spp. In a clinical specimen using a CIDT		N	
Isolation of <i>Campylobacter</i> spp. From a clinical specimen	N		
<b>Epidemiological Evidence</b>			
Epidemiologically linked to a confirmed or probable laboratory-confirmed case of campylobacteriosis			N
Member of a risk group as defined by the public health authorities during an outbreak			O
<b>Criteria to distinguish a new case:</b>			
Not counted as a new case if occurred within 30 days of a previous reported case in the same individual	N	N	N
<p><b>Notes:</b>                      S = This criterion alone is Sufficient to classify a case.                      N = All N criteria in the same column are Necessary to classify a case. A number following an N indicates that this criterion is only required for a specific disease/condition subtype (see below).                      A = This criterion must be absent (e.g., NOT present) for the case to meet the classification criteria.                      O = At least one of these O (Optional) criteria in each category (e.g., clinical evidence and laboratory evidence) in the same column in conjunction with all N criteria in the same column is required to classify a case. (These optional criteria are alternatives, which mean that a single column will have either no O criteria or multiple O criteria; no column should have only one O.) A number following an O indicates that this criterion is only required for a specific disease/condition subtype.</p>			

**Comment**

The use of CIDT as standalone tests for the direct detection of *Campylobacter* in stool appears to be increasing. Data available about the performance characteristics of these assays indicates there is variability in the sensitivity, specificity, and positive predictive value of these assays depending on the test (EIA test format -lateral flow or – microplate) and manufacturer. Therefore, it is useful to collect information on which type of EIA test and manufacturer are used to diagnose a case. Culture confirmation of CIDT positive specimens is ideal.

## **Case Investigation Process**

- Food handlers should be excluded from work until diarrhea has resolved. Negative stool specimens may also be required.
- Assure isolate submission to UPHL.

## **Outbreaks**

CDC defines a foodborne outbreak as “an incident in which two or more persons experience a similar illness resulting from the ingestion of a common food.” In order to confirm an outbreak of campylobacteriosis, the same *Campylobacter* species must be isolated from clinical specimens from at least two ill persons, or the species must be isolated from an epidemiologically implicated food. The source of the infection should be identified and measures to identify additional ill persons and/or to remove the source from consumers should be taken.

## **Identify Case Contacts**

When a neonatal case is less than one month of age, use the following data entry procedure:

### **UTNEDSS/ Trisano Data Entry**

- The mother is the case-patient, or “parent” CMR
  - Enter mother’s medical record number in parent CMR
  - Enter mother’s symptoms in the parent CMR
  - Enter mother’s exposure history in parent CMR
  - Add attachments and lab report(s) for mother on parent CMR
- Neonate is entered as a contact of the mother
  - Enter neonate medical record number as a contact of the mother
  - Enter neonate symptoms as a contact of the mother
  - Enter neonate exposure as a contact of the mother
  - Add attachments and lab report(s) for neonate as a contact of the mother
- Neonate may be promoted to own CMR as appropriate
- When searching UTNEDSS/ Trisano for name of mother or neonate, both CMRs should come up in search results.

## **Childcare**

Since campylobacteriosis may be transmitted from person-to-person through fecal-oral transmission, it is important to follow-up carefully on cases of campylobacteriosis in a childcare setting. General recommendations include:

- Children with *Campylobacter* infection who have diarrhea should be excluded until their diarrhea is resolved.
- Children with *Campylobacter* infection who have no diarrhea and are not otherwise ill may be excluded, or may remain in the program if special precautions are taken.

- Most staff in childcare programs are considered food handlers. Those with *Campylobacter* in their stool (symptomatic or not) can remain on site, but must not prepare food or feed children until their diarrhea has resolved. Negative stool specimens may be required.

## **School**

Since campylobacteriosis may be transmitted from person to person through fecal-oral transmission, it is important to follow-up on cases in school settings. General recommendations include:

- Students or staff with *Campylobacter* infection who have diarrhea should be excluded until their diarrhea is resolved.
- Students or staff with *Campylobacter* who do not handle food, have no diarrhea or have mild diarrhea, and are not otherwise sick may remain in school if special precautions are taken.
- Students or staff who handle food and have *Campylobacter* infection (symptomatic or not) must not prepare food until their diarrhea is gone and they have one negative stool specimen (collected at least 48 hours after completion of antimicrobial therapy, if antimicrobials are given).

## **Community Residential Programs**

Actions taken in response to a case of campylobacteriosis in a community residential program will depend on the type of program and the level of functioning of the residents.

In long-term care facilities, residents with campylobacteriosis should be placed on standard (including enteric) precautions until their symptoms subside. Staff members who give direct patient care (e.g., feed patients, give mouth or denture care, or give medications) are considered food handlers and should be treated as such. In addition, staff members with *Campylobacter* infection who are not food handlers should not work until their diarrhea is resolved.

In residential facilities for the developmentally disabled, staff and clients with campylobacteriosis must refrain from handling or preparing food for other residents until their diarrhea has subsided. Negative stool specimens may be required. In addition, staff members with *Campylobacter* infection who are not food handlers should consider not working until their diarrhea is resolved.

## ✓ REFERENCES

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Council for State and Territorial Epidemiologists (CSTE) Position statements. Available from URL: <http://www.cste.org/default.asp?page=PositionStatements>.

Enteric disease differential diagnosis example available at URL: <https://online.epocrates.com/u/29351175/Campylobacter+infection/Diagnosis/Differential>.

## ✓ VERSION CONTROL

V.03.15: Describe updates here.

**Clinical Description** - Added a table and more detailed description of symptoms.

**Causative Agent** - Added a photo and description of the other serotypes of *Campylobacter*.

**Differential Diagnosis** - Added a link to a website with an actual Dx Diag.

**Laboratory Identification** - Clarified that even CIDT results should be forwarded to UPHL.

**Treatment** - Added the new recommendations from Up-to-Date.

**Case Fatality** - Updated, added percentages instead of national counts.

**Transmission** - Updated to include a chart of risk factors that cases mentioned in Utah.

**Epidemiology** - Added statistics, updated old and inaccurate estimates of case counts.

**Case Investigation** - Updated to make a specific note that *Campylobacter* is now a nationally notifiable condition.

## ✓ UT-NEDSS Minimum/Required Fields by Tab

### MORBIDITY EVENT

#### Demographic

- Last Name
- First Name
- State
- Date of Birth
- Zip Code
- Phone Number
- Birth Gender
- Ethnicity
- Race

#### Clinical

- Disease
- Onset Date
- Died
- Diagnostic Facility
- Symptoms

#### Laboratory

- Laboratory Name
- Test Type
- Test Result
- Collection Date

#### Contacts

- Does case's infection appear secondary to another person's infection?

#### Epidemiological

- Food Handler
- Health Care Worker
- Group Living
- Day Care Association

#### Reporting

- Date first reported to public health

#### Investigation (Priority, not minimum)

- Did the patient drink raw or unpasteurized milk during the exposure period?
  - (if yes) restaurant, store, or dairy where purchased:
  - (if yes) dates of purchase:
- Did the patient eat soft, imported, or unpasteurized cheese (queso fresco, etc.) during the exposure period?
  - (if yes) specify details:
  - (if yes) restaurant or store name:
- Did patient have contact with ANY animals (including farm animals, pets) during the exposure period?
- What animals did the patient have contact with?
- Did the patient have contact with any animals not listed above?

#### Administrative

- State Case Status (completed by UDOH)