

## A. Agent:

*Campylobacter* is a gram-negative, microaerophilic bacterium<sup>1</sup>. *Campylobacter jejuni* and less often, *Campylobacter coli*, are the usual causes of *Campylobacter* gastroenteritis in humans<sup>1,2</sup>.

## B. Clinical Description:

*Campylobacter* infection causes diarrhea, which may be watery or sticky and can contain blood (usually occult) and fecal leukocytes (white cells)<sup>2</sup>. Other symptoms often present are fever, abdominal pain, nausea, headache, and muscle pain<sup>1,2</sup>. Illness generally lasts 7-10 days, but relapses are not uncommon (about 25% of cases)<sup>1</sup>. The infective dose of *C. jejuni* is considered to be small. Human feeding studies suggest that about 400-500 bacteria may cause illness in some individuals, while in others, greater numbers are required<sup>1,3</sup>. *C. jejuni* may also be an invasive organism.

It is one of the most common causes of “traveler’s diarrhea”<sup>2</sup>. Many infections are asymptomatic<sup>2</sup>. Patients can experience prolonged and/or severe illness. Guillain-Barré syndrome (GBS), Reiter syndrome, and erythema nodosum are rare events that can occur during convalescence<sup>1</sup>. Approximately 1 in 1000 diagnosed infections lead to GBS, a paralysis that lasts several weeks and usually requires intensive care<sup>3</sup>.

### ▪ Differential Diagnosis:

Salmonellosis, *E. coli*, shigellosis, giardiasis, cholera, hepatitis A, listeriosis, typhoid fever.

## C. Reservoirs:

Most frequently poultry and cattle<sup>1-3</sup>. Puppies, kittens, and other pets can be a source of infection for humans as well<sup>1-2,4</sup>.

## D. Mode of Transmission:

By ingestion of the organisms in raw poultry and pork, contaminated food and water, unpasteurized dairy, juices, and ciders; from contact with infected pets, farm animals or infected infants<sup>1-3</sup>. Person-to-person transmission, which occurs by hand-to-mouth transfer of feces, appears to be uncommon<sup>1-3</sup>.

## E. Incubation Period:

Two to five days, with a range of 1 to 10 days depending upon dose ingested<sup>1,2</sup>.

## F. Period of Communicability:

Throughout the course of the illness. Individuals not treated with antibiotics excrete organisms for 2 to 7 weeks; treatment reduces the shedding period to two or three days<sup>1,2</sup>.

## G. Susceptibility and Resistance:

Immune mechanisms are not well understood, but lasting immunity to serologically related strains follows infection<sup>2</sup>. In developing countries, most people develop immunity in the first two years of life<sup>2</sup>.

## H. Treatment:

Most infected with *Campylobacter* recover without any specific treatment<sup>1-3</sup>. Patients should drink extra fluids as long as the diarrhea lasts<sup>3</sup>. In more severe cases, antibiotics such as azithromycin or erythromycin can shorten the duration of symptoms if given early in the illness<sup>1,3</sup>.

**I. Clinical Case Definition<sup>6</sup>:**

An infection that may result in diarrheal illness of variable severity.

**J. Laboratory Criteria for Diagnosis<sup>2</sup>:****Confirmatory Testing**

- Isolation of *Campylobacter* spp. from any clinical specimen.

**Supportive Testing**

- Detection of *Campylobacter* spp. in a clinical specimen using culture-independent diagnostic tests (CIDTs).

Case Classification	
<b>Confirmed</b>	Isolation of <i>Campylobacter</i> spp. from a clinical specimen.
<b>Probable</b>	A case that meets the supportive laboratory criteria; <b>OR</b> A clinically compatible case that is epidemiologically linked to a case that meets the confirmatory or supportive laboratory criteria.

**K. Classification of Import Status:**

Reflects where the infection was acquired: in county, in state, international, out of county but in Arizona, out of state but in U.S., or location of infection is unknown. Mark as *bi-national* if infection was acquired in Mexico during the exposure period.

**L. Laboratory Testing<sup>8</sup>:**

TEST	SPECIMEN & TRANSPORT	TESTING AVAILABILITY
<b>Culture</b>	Stool; Cary-Blair transport medium; transport cold	At ASPHL by request and during outbreak situations
<b>Antigen based, non-culture (rapid)</b>	Stool	Included as part of BioFire PCR – by request at ASPHL

**M. Assessing Laboratory Results<sup>5</sup>:**

Culture is the gold standard for identification of campylobacter. However, the use of non-culture methods as standalone tests to detect *Campylobacter* appears to be increasing, and may lead to an increase in false positive results. [CDC update on non-culture methods.](#)

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.

**N. Outbreak/Cluster Definition<sup>7</sup>:**

- An unexpected increase in cases of laboratory-confirmed *Campylobacter* infection clustered by time, place, or person; OR
- Diagnosis or detection of two or more individuals, not from the same household or family, who experience an illness clinically compatible with *Campylobacter* infection, at least one with laboratory-confirmed campylobacteriosis, within a 1-week period, in a particular setting or with a defined epidemiological link.

**O. Time Frame<sup>9</sup>:**

All confirmed and probable cases in a food handler, nursing home caregiver, or childcare worker or attendee are to be reported within 24 hours to the local health jurisdiction. Control measures should be initiated within 24 hours of initial report.

Outbreaks should be entered into MEDSIS Outbreak Module within 24 hours of receipt of report.

**P. Forms:**

- ADHS *Campylobacter* Investigation Form:

<https://www.azdhs.gov/documents/preparedness/epidemiology-disease-control/disease-investigation-resources/frm-campy.doc>

**Q. Investigation Steps:****Confirm Diagnosis**

- The current case definition should be used to confirm the diagnosis.
- Collect case's demographic data and contact information:
  - Birth date, county, sex, race/ethnicity, address, phone number(s).
- For hospitalization, obtain medical records, including admission notes, progress notes, lab report and discharge summary.

**Conduct Case Investigation**

- Confirmed cases will immediately be entered into MEDSIS and contacted by the investigator.
  - The investigator will attempt three phone calls, or text messages following unreturned voicemails, before sending a letter to patient's address.
  - All interview attempts, even if unsuccessful (i.e., leaving a voicemail or text message), should be entered into the Case Contacted & Interviews table in MEDSIS as close to real time as possible.
  - If phone numbers appear invalid or non-functioning, contact [food@azdhs.gov](mailto:food@azdhs.gov) to request a LexisNexis search. This can be conducted for individuals 18 years and older. For those younger than 18, please have a parent/guardian name available.
  - All cases should be interviewed using the ADHS *Campylobacteriosis* Form to establish the source of infection, provide prevention education, and identify if case works or attends a childcare, healthcare, or food handling setting.
- Focus within the incubation period and on potential sources of infection:
  - Exposure to others with diarrhea in or outside of household. Obtain relationship to case, occupation(s) and dates of onset and exposure.
  - Food history, 7 days prior to onset, including place of purchase (e.g., poorly cooked meat, poultry or eggs, and unpasteurized dairy products). Consider food-handling practices and opportunities for cross-contamination.
  - Restaurant or group gathering history, 7 days prior to onset. Obtain name, location of restaurant/gathering, food eaten and exposure dates.
  - Contact with animals 7 days prior to onset. Specify type and location (e.g. farm, petting zoo, school).
  - In-state and out-of-state travel up to 2 weeks prior to onset. Obtain dates and locations. [Including hiking, camping or hunting trips]
  - Drinking water sources. Specify type (e.g. private, treated, or bottled)
  - Recreational water exposure. Obtain dates, locations and participation type.
  - Association with childcare, residential facility/institution. Obtain dates of attendance and locations.
  - Health history; underlying medical conditions, medical/surgical or GI procedures, medications (including over-the-counter and "organic/holistic" or vitamins and herbs.)

- For infants <3 months of age, if a source is not identified, may need to obtain detailed epidemiologic data and cultures on caretaker(s), even if asymptomatic.
  - Carefully review food-handling practices to determine whether cross-contamination of infant formula or food may be involved.

### Conduct Contact Investigation

- Consider the following types of contacts during a contact investigation:
  - Close: Household and intimate/sexual contacts or those who ate food prepared by the case.
  - Daycare: Anyone sharing classroom with the case.
  - School: Epidemiologic evidence of transmission, consider those who share similar exposure activities with the cases (e.g. common food/drink, animal or recreational water sources).
  - Food Service: Patrons of the establishment of an infected food handler if the food handler worked while infectious, had poor personal hygiene, and had bare-hand contact with ready-to-eat food.
  - Identify epi-links among cases (cluster, household, co-workers, etc).

### Initiate Control and Prevention Measures

- Enteric precautions followed for the duration of acute symptoms.
- Symptomatic people should be excluded from food handling, care of patients in hospitals, and care of people in custodial care and child care centers until no longer symptomatic or until treatment has been maintained for at least 24 hours.
  - Household contacts with symptoms may be excluded from working as a food handler. See A.A.C. R9-6-311 for specific guidelines.
  - If the specimen is positive for *Campylobacter sp.* the contact shall be considered a case and the case control measures apply.

### Isolation, Work and Child Care Restrictions

Per **A.A.C. R9-6-311**, exclude a Campylobacteriosis case or suspect case from working as a food handler, caring for children in or attending a child care establishment, or caring for patients or residents in a health care institution until:

- a. Diarrhea has resolved,
- b. A stool specimen negative for *Campylobacter spp.* Is obtained from the Campylobacteriosis case or suspect case, or
- c. The local health agency has determined that the case or suspect case is unlikely to infect other individuals.

For Child Care Setting:

- Children with diarrhea may need to be excluded. See A.A.C. R9-6-311 for specific guidelines.
- If a case attends or works in a child care setting, perform the following activities:
  - Interview the center director and ask they review attendance records to identify staff or attendees with a history of diarrheal illness within the past 2 weeks.
  - Reinforce the need to exclude symptomatic children or adults. Exclude symptomatic children and adults until diarrheal symptoms have resolved for 24 hours.
  - Coordinate activities with Environmental Health staff or Childcare Nurse Consultants (CCNC), if applicable, to thoroughly inspect the facility.
  - Review findings with daycare operator and implement control measures.
  - Educate on how to prevent disease transmission at center and at home (i.e. hand washing and disinfection). Investigate handwashing, diapering and disinfection procedures.

**NOTE: Testing of all symptomatic individuals is not a good use of resources.**

#### For Food Handling Setting:

- Food handlers with symptoms may not handle food or may be excluded from work. See A.A.C. R9-6-311 for specific guidelines.
- Coordinate the following activities with Environmental Health Staff:
  - Interview manager and identify possible cases among staff or patrons within the past 2 weeks.
  - If a case or suspect case is identified among staff or if >1 case or suspected case is associated with the facility, a thorough inspection of the establishment is indicated.
  - Workers in schools, residential programs, daycare and healthcare facilities, who feed, give mouth care or dispense medications to clients subject to the same restrictions as food handlers.

#### Case Management

- Educate case on measures to avoid future illness and transmission.
- Follow-up is indicated if a case cares for young children, the elderly or patients or handles food to assure compliance with work restrictions.
- Additional stool cultures are not routinely indicated.

#### Contact Management, including Susceptible Contacts

- Protection or prophylaxis: None.
- Provide education on avoiding further exposures and to ensure proper medical care is obtained and precautions taken if symptoms develop.
- Symptomatic contact: Considered a probable case; initiate any work or child care/school restrictions. Encourage to seek medical evaluation.
- Follow-up of contacts may be needed to assure no transmission of disease.

#### Notifications

- Organize, collect and report data utilizing the ADHS Campylobacteriosis Investigation Form.
- Report data electronically via MEDSIS or by fax if necessary, include:
  - All essential data that was collected during the investigation, especially data that helps to confirm or classify a case.
  - Remember to verify all key Disease Specific Observation (DSO) fields are filled out.
  - For epi-linked cases, please include the MEDSIS ID of the related case in the case notes section.

#### R. Outbreak/Cluster Guidelines:

Please refer to Enteric Outbreak/Cluster Guidelines in the general outbreak guidelines section.

### **Childcare Settings:**

See above under “Investigation Steps.”

### **Public Gathering Implicated:**

- Food sources may include undercooked meat, cross-contaminated food, or possibly food contaminated by food handler.
- Conduct active case finding; ask about recent illness among food handlers.
- If a food establishment or distributor is implicated contact Environmental Services to coordinate investigation.
- If animal sources are implicated:
  - Hygienic and control measures may need to be initiated on farms, petting zoos or fairs.
  - Pets and other domestic animals may need to be treated to control.
  - Proper handwashing after handling animals should always be stressed.

### **Health Care Setting Associated<sup>10</sup>:**

- Hospitals: *Campylobacter*, while usually community acquired, has on rare occasion been associated with nosocomial infections.
  - Nosocomial describes infections not present or incubating prior to the patient being admitted but acquired in hospitals and usually observed >48 hours after admission. As the incubation period will vary to some extent based on underlying health conditions, each infection should be assessed individually. Nosocomial infections include those acquired in the hospital but not evident until after discharge.
- If a healthcare setting associated case is identified, contact program manager for guidance and coordinate investigation efforts with hospital infection control.
- Nursing home: Crowded communal living conditions and age-related risk factors including immune status and higher rates of antibiotic usage, dementia, and incontinence may allow transmission of enteric pathogens.
- Coordinate investigation efforts through nursing home administrator.

### **Intentional Contamination:**

- If suspected, notify Program Manager/Supervisor.
- Obtain demographic information on all laboratory specimens for BT.
- Implement “Chain of Custody” procedures for all samples collected, as they will be considered evidence in a criminal investigation.
- Refer to the ADHS [Foodborne Illness and Outbreak Investigation Manual](#).

## Additional Information & Resources

**Campylobacter Infections:** American Academy of Pediatrics. 2009 Red Book: Report of the Committee on Infectious Disease, 28th Edition. Illinois, Academy of Pediatrics, 2009: 262-264.

**Campylobacter enteritis:** Heymann. D., ed., Control of Communicable Diseases Manual, 19th Edition. Washington, DC, American Public Health Association, 2009: 94-98.

**ADHS Case Definitions for Reportable Communicable Morbidities, 2018:**

<http://www.azdhs.gov/documents/preparedness/epidemiology-disease-control/disease-investigation-resources/case-definitions.pdf>

**Arizona Regulations/Statutes Related to Infectious Disease:**

[https://apps.azsos.gov/public\\_services/Title\\_09/9-06.pdf](https://apps.azsos.gov/public_services/Title_09/9-06.pdf)

**CDC Campylobacteriosis:**

<http://www.cdc.gov/nczved/divisions/dfbmd/diseases/campylobacter/>

**FDA Bad Bug Book available at:**

<http://www.fda.gov/Food/FoodSafety/FoodbornIllness/FoodbornIllnessFoodbornePathogenNaturalToxins/BadBugBook/default.htm>

## References

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[http://www.kdheks.gov/epi/Investigation\\_Guidelines/Campylobacter\\_Investigation\\_Guideline.pdf](http://www.kdheks.gov/epi/Investigation_Guidelines/Campylobacter_Investigation_Guideline.pdf)