

CAMPYLOBACTERIOSIS

Revised 7/17/2011

Campylobacteriosis is an infectious disease caused by bacteria of the genus *Campylobacter*. Although *Campylobacter* was first identified in 1886 by Escherich in stool samples of children with diarrhea, its public health importance was not recognized until the 1970's when the development of selective growth media permitted more laboratories to test stool specimens for *Campylobacter*. Soon *Campylobacter* was identified as a common human pathogen.

Campylobacter jejuni infections are now the leading cause of bacterial gastroenteritis reported in the United States. In 1996, 46% of laboratory-confirmed cases of bacterial gastroenteritis reported to the Centers for Disease Control and Prevention (CDC), the U.S. Department of Agriculture and the Food and Drug Administration collaborating sites were caused by *Campylobacter*. Campylobacteriosis is followed in prevalence by salmonellosis (28%), shigellosis (17%), and *Escherichia coli* O157 infection (5%).

Epidemiology

Campylobacteriosis is estimated to affect about 1% of the population (1,000 per 100,000), with many cases going undiagnosed or unreported. Even though surveillance is very limited, approximately six cases for each 100,000 persons in the U.S. population are reported to the CDC, while in Louisiana the reported incidence is about three per 100,000. Virtually all cases occur as isolated, sporadic events, rather than as a part of outbreaks.

The most common reservoir for campylobacter is poultry and cattle, with more than half of the raw chicken in the U. S. market containing the bacteria. Water or milk may be a source for sporadic cases or outbreaks. Animals (puppies, kittens, other pets, swine, sheep, rodents and birds) can also be infected; some people acquire their infections from contact with the infected stool of an ill dog or cat. The organism is usually not spread from person to person, but person-to-person contact can result in illness if the infected person is a small child, or is producing a large volume of diarrhea.

Most cases of campylobacteriosis are associated with handling of raw poultry, or eating raw or undercooked poultry meat. A main source of cross-contamination of raw or lightly cooked foods is the use of cutting boards that have not been cleaned thoroughly after cutting poultry or meat.

It is estimated that about 5% of human cases originate from contacts with pets, particularly dogs and cats. In a survey carried out in Baton Rouge, LA. the prevalence of *Campylobacter* was estimated at 1%.

The bacterium is fragile and sensitive to freezing, drying, acidic conditions (pH < 5.0), and salinity. It grows only if there is less than the atmospheric amount of oxygen present.

The infectious dose is about 1 billion colony forming units.

The incubation period is 1 to 7 days.

Clinical Description

Some persons who are infected with *Campylobacter* don't have any symptoms at all. Most people with campylobacteriosis get diarrhea, cramping, abdominal pain and fever. The diarrhea may be bloody and

can be accompanied by nausea and vomiting. The illness typically lasts one week.

Less frequently, *C. jejuni* infections produce bacteremia, septic arthritis and other extra-intestinal symptoms. Common complications of campylobacteriosis in HIV-infected patients are recurrent infection and infection with antimicrobial-resistant strains.

Most people who get campylobacteriosis recover completely within 2 to 5 days, although sometimes recovery can take up to 10 days.

Severe complications of Campylobacter infection are:

- a life-threatening sepsis in persons with compromised immune systems.
- arthritis
- Guillain-Barré syndrome (GBS), an auto-immune demyelating disorder resulting in acute neuromuscular paralysis, is a serious sequela of Campylobacter infection. An estimated one case of GBS occurs for every 1,000 cases of campylobacteriosis.
- Campylobacteriosis is also associated with Reiter syndrome, a reactive arthropathy. In approximately 1% of patients with campylobacteriosis, the sterile postinfection process occurs 7 to 10 days after onset of diarrhea. Multiple joints can be affected, particularly the knee joint. Pain and incapacitation can last for months, or become chronic.

Deaths from *C. jejuni* infection are rare and occur primarily in infants, the elderly and patients with underlying illnesses.

Laboratory Tests

Non-culture methods for Campylobacter

The use of non-culture methods as standalone tests for the direct detection of Campylobacter in stool appears to be increasing, which may have important implications for both patient management and public health surveillance efforts. There is currently limited data available about the performance characteristics of these assays. Some laboratories are noting a significant increase in the number of Campylobacter-positive stools using these assays. This may be due to superior performance of these assays or it may be due to a specificity problem with the assays (i.e. false positive results). As isolates are not recovered using these assays, some laboratories have begun sending Campylobacter positive EIA broths to their state public health laboratory for culture confirmation, similar to the situation for STEC positive EIA broths.

There are currently three different antigen-based, non-culture methods commercially available in the U. S. for direct detection of Campylobacter in stool; a fourth assay will soon go into clinical trial:

- ProSpecT Campylobacter assay (Remel). This is an EIA test that has been on the market for several years; takes about two hours to perform. When compared to culture, the ProSpecT EIA has been shown to vary in sensitivity from 80%-96%, and has a specificity of about 97%
- PREMIER™ CAMPY assay (Meridian Biosciences). This EIA test received FDA approval in Feb 2009; it takes approximately 2.5 hours to perform. PREMIER™ CAMPY assay: Sensitivity 96.7%, specificity 95.6%
- ImmunoCard STAT! CAMPY (Meridian Biosciences). This is a rapid (20 minutes) lateral flow monoclonal antibody-based immunoassay that received FDA approval in June 2009. ImmunoCard STAT! CAMPY: Sensitivity 98.1%, specificity 95.9%
- Xpect Campylobacter assay (Remel). This is a rapid test equivalent to the Meridian ImmunoCard STAT! CAMPY test. No performance data is currently available for this assay as it is still in development; it is due to go into clinical trial soon.

Stool culture

If possible, stool specimens should be chilled (not frozen), and submitted to a laboratory within 24 hours of collection. Storing specimens in deep, airtight containers minimizes exposure to oxygen and desiccation. Stool specimens should be collected on cotton-tipped swabs and the swabs then placed in a tube of Cary-Blair culture medium. These tubes can be obtained from the regional laboratories. Specimens in Cary-Blair should be refrigerated and transported to the lab under refrigerated conditions as soon as possible. (If necessary to hold 48 hours or longer, freeze sample at -7°C and transport to lab in a frozen state; however this reduces the probability of a positive culture).

Food samples

The State laboratory is set up to culture campylobacter from food. Food samples that are sent in should be handled by the sanitarian. In the absence of a sanitarian, submit at least 100 grams (approx. 4-5 oz.) of each suspected food item. Be sure to keep food refrigerated (not frozen). Results of the cultures will not be available in less than 72 hours. In order to identify the organism causing the outbreak, it is very important to obtain samples of the suspected food and several stool specimens.

Stool antigen EIA tests for Campylobacter have been developed with there being presently two commercially available: The ProSpecT Campylobacter immunoassay (Alexon-Trend, Inc., distributed through Remel), and the Ridascreen Campylobacter assay (R-Biopharm, Darmstadt, Germany). The case definition has not changed and a positive culture is still required for a confirmed case.

Surveillance

Campylobacter is a reportable condition with reporting required within 5 business days.

Case Definition

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

Laboratory criteria for diagnosis: Isolation of Campylobacter from any clinical specimen.

Probable: A clinically compatible case that is either

- Positive on EIA or PCR or
- Epidemiologically linked to a confirmed case.

Confirmed: A case that is laboratory confirmed.

Investigation

Report and Confirm Early Cases: The purpose of investigation is to identify cases, to differentiate between other bacterial infections, to identify the source(s) of illness and to institute disease control measures to prevent further spread of the disease.

Upon receipt of a report of a case of campylobacter, contact the physician or hospital to confirm the diagnosis.

It is not necessary to follow-up on each individual, isolated case of campylobacter. Only under certain circumstances is further evaluation necessary, such as:

- if a physician requests family members be tested
- if the case appears to be associated with a child care center, institution, nursing home, etc.
- if follow-up is requested by the Infectious Disease Epidemiology Section
- if the case is suspected to be part of a foodborne outbreak

If the case is suspected to be part of a foodborne outbreak, the first concern would be to determine the

source(s) of the infection. Check recent food history and recover all suspected foods for appropriate testing.

Case Management - Treatment

Although *Campylobacter* infections are usually self limiting, antibiotic therapy may be prudent for patients who have high fever, bloody diarrhea, or more than eight stools in 24 hours; immunosuppressed patients, patients with bloodstream infections and those whose symptoms worsen or persist for more than one week from the time of diagnosis. When indicated, starting antimicrobial therapy soon after the onset of symptoms can reduce the median duration of illness from approximately 10 days to 5 days. When treatment is delayed (e.g., until *C. jejuni* infection is confirmed by a medical laboratory), therapy may not be successful. Ease of administration, lack of serious toxicity and high degree of efficacy make erythromycin the drug of choice for *C. jejuni* infection; however, other antimicrobial agents, particularly the quinolones and newer macrolides including azithromycin, are also used.

- Symptomatic individuals should be excluded from foodhandling and from direct care of hospitalized and institutionalized patients, and child care centers.
- Infants in diapers with symptomatic campylobacter infection preferably should not return to child care until they have received at least two days of antibiotic treatment or the diarrhea has subsided.
- If the case is associated with a child care center (either attendee or staff member), contact the owner/director to provide notification of the case and to determine if any other cases have occurred. The normal procedure to follow up includes testing symptomatic individuals if a second case has been confirmed. Once the laboratory test results are available on those persons, a decision can be made regarding further testing or referral.

Hospital precaution and isolation: Contact precautions should be used during the acute illness and until stool cultures become negative.

Prevention of transmission

On the Farm: Control of *Campylobacter* contamination on the farm may reduce contamination of carcasses, poultry and red meat products at the retail level. Epidemiologic studies indicate that strict hygiene reduces intestinal carriage in food-producing animals. In field studies, poultry flocks that drank chlorinated water had lower intestinal colonization rates than poultry that drank unchlorinated water. Experimentally, treatment of chicks with commensal bacteria and immunization of older birds reduced *C. jejuni* colonization. Because intestinal colonization with campylobacter readily occurs in poultry flocks, even strict measures may not eliminate intestinal carriage by food-producing animals.

At Processing: Slaughter and processing provide opportunities for reducing *C. jejuni* counts on food-animal carcasses. Bacterial counts on carcasses can increase during slaughter and processing steps.

Preventing the sale of raw milk.

Consumer education:

When outbreaks occur, community education efforts can be directed at proper food handling techniques, especially thorough cooking of all poultry and other foods of animal origin and common sense kitchen hygiene practices:

- Cook all poultry products thoroughly. Make sure that the meat is cooked throughout (no longer pink), any juices run clear and the inside is cooked to 170°F (77°C) for breast meat and 180°F (82°C) for thigh meat. If you are served undercooked poultry in a restaurant, send it back for further cooking.
- Wash hands with soap before handling raw foods of animal origin. Wash hands with soap after handling raw foods of animal origin and before touching anything else.

- Prevent cross-contamination in the kitchen. Use separate cutting boards for foods of animal origin and other foods. Carefully clean all cutting boards, countertops and utensils with soap and hot water after preparing raw food of animal origin.
- Avoid consuming unpasteurized milk and untreated surface water.
- Make sure that persons with diarrhea, especially children, wash their hands carefully and frequently with soap to reduce the risk of spreading the infection.
- Wash hands with soap after having contact with pet feces.