# Campylobacteriosis

Wetlands supporting groups of susceptible animals

**Wildlife ✓**
**Livestock ✓**
**Human ✓**

Synonyms: *Campylobacter enteritis*, vibrionic enteritis, vibriosis

## KEY FACTS

**What is campylobacteriosis?**

An infectious disease of humans and a range of animals including birds caused by their exposure to species of *Campylobacter spp.* bacteria. The bacterium is found commonly in the intestines of healthy livestock and poultry but also in most species of wild mammals and birds, other wildlife and the environment, surviving in mud slurries and polluted water for up to three months. The prevalence of infection in animals is much higher than the incidence of disease. Most *Campylobacter spp.* do not cause any signs of illness in the animal host although some may cause diarrhoea and sporadic cases of abortion in ruminants. The infection can spread rapidly between animals, particularly when they are gathered in dense concentrations.

*Campylobacter spp.* remain one of the main causes of gastroenteritis in humans globally. Humans usually contract the bacteria through the consumption and handling of contaminated meat and water but also through direct contact with infected animals and their faeces. Illness usually occurs in single, sporadic cases, but it can also occur in outbreaks, when a number of people become ill at one time.

**Causal agent**

Fourteen species of bacteria from the genus *Campylobacter: C. coli, C. concisus, C. curvus, C. fetus, C. gracilis, C. helveticus, C. hyointestinalis, C. jejuni, C. lari, C. mucosalis, C. rectus, C. showae, C. sputorum* and *C. upsaliensis.* Campylobacteriosis in humans is mainly caused by *C. jejuni* and, to a lesser extent, *C. coli.*

**Species affected**

Many species of domestic and wild animals including cattle, sheep, goats, pigs, dogs, cats, poultry (including ducks and geese), wild birds, rodents and marine mammals. Humans are very susceptible to illness caused by certain *Campylobacter spp.* bacteria.

**Geographic distribution**

*C. jejuni, C. coli* and *C. fetus* infections are found worldwide. The importance of each *Campylobacter spp.* differs between geographical regions. In humans, infections are particularly common in very young children in developing countries and young adults in developed countries.

**Environment**

Any environment supporting *Campylobacter spp.* and their animal hosts.

## TRANSMISSION AND SPREAD

**Vector(s)**

The bacterium is not vector-borne but may be spread mechanically through infected animals and contaminated objects such as equipment, clothing, shoes, feed and water. Flies can also act as mechanical vectors for *Campylobacter spp.*

**How is Campylobacter transmitted to animals?**

Direct contact with infected faeces, vaginal discharges and abortion products and through ingesting water and food contaminated with bacteria. Water courses can easily become contaminated from infected faeces of livestock and wild birds. Flies can also act as mechanical vectors for *Campylobacter spp.*

**How does Campylobacter spread between groups of animals?**

Spread from one animal group to another by an infected animal which will shed the bacteria into the environment in its faeces. Bacteria may also be introduced to herds and flocks on shoes, equipment and other contaminated objects (fomites). Exactly how the infection spreads between and within herds and flocks is not fully understood due to the difficulties of detecting clinical signs in animals.

Few studies exist of the transmission between wild and domestic animals, but what evidence there is suggests this is rare.

**How is Campylobacter transmitted to humans?**

Most commonly transmitted by handling and ingesting contaminated food, particularly undercooked poultry, meat and unpasteurised milk, or from cross-contamination of other foods by these items, and through drinking contaminated water. Also transmitted through direct contact with infected animals and their faeces and may be spread through person to person contact if hygiene is poor. There is some evidence that feral and domestic pigeons in peri-domestic settings can carry *C. jejuni* and potentially transmit this agent to humans through the environment.

## IDENTIFICATION AND RESPONSE

**Field signs**

Infected animals, both domestic and wild, may have diarrhoea but many will not show any symptoms and hence *Campylobacter spp.* can be difficult to detect. *Campylobacter spp.* may cause enteritis and infections by *C. fetus* may cause infertility and spontaneous abortion in sheep and cattle.

Humans may suffer from watery or bloody diarrhoea, abdominal pain, fever, headache, nausea and vomiting. Symptoms usually start 2–5 days after infection and last for 3–6 days. Some infected people do not show any symptoms at all.

**Recommended action if suspected**

Contact and seek assistance from human and animal health professionals immediately if there is suspected infection in people and/or livestock. An outbreak may mean that many humans and animals are exposed to a common contaminated food item or water source.

**Diagnosis**

Isolation of the causative agent by health professionals is needed for a definitive diagnosis. Faeces or blood cultures are used for isolating the bacteria in humans, and in mammals and birds, faeces, rectal swabs and/or caecal contents are required. Ideally, fresh faeces should be collected, preferably without traces of urine. Samples should be prevented from drying out. A medium should be used for transporting swabs.

In dead birds, the caecum is usually used for the detection of *Campylobacter spp.* and can be cut with sterile scissors from the remaining part of the intestines and submitted intact to the laboratory in a plastic bag or petri-dish. Samples from dead cattle, sheep and pigs are collected from the intestines by aseptically opening the gut wall. Samples should ideally be transported to the laboratory the same day but if not, within two days. Samples must be protected from light and not kept in high (>20°C) or low (<0°C) temperatures. Storage at 4°C is recommended.

## PREVENTION AND CONTROL IN WETLANDS

### Overall

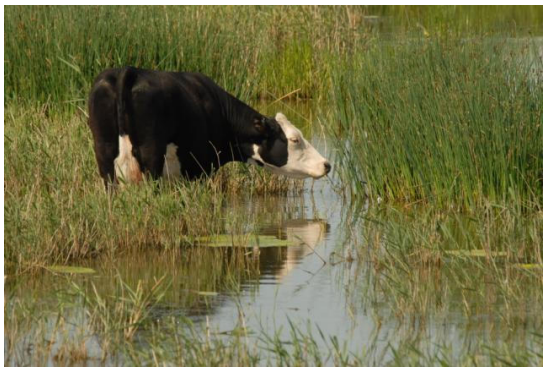
Prevention and control measures are limited in wetlands with free-living animals, many of which will carry the bacteria without any noticeable signs and untoward effects. Transmission of bacteria from animals to humans and between captive animals can be more easily prevented and controlled.

**Monitoring and surveillance**
Recording the incidence of outbreaks can identify trends in *Campylobacter spp.* infections and evaluate the feasibility of control programmes. Monitoring of outbreaks in animals and humans can also help assess the contribution of animals to human illness.

### Livestock

The control of *Campylobacter spp.* along the food chain is most effective when the colonisation of living animals with bacteria can be prevented.

- **Good biosecurity** will help protect captive animals from bacteria and prevent cross-contamination:
  - Have disinfection facilities for hands, footwear, clothing, equipment and vehicles/trailers on entering or leaving areas with livestock and after contact with animals.
  - Wear protective clothing and footwear, either disposable or easily disinfected re-usable clothes (*e.g.* waterproof clothing, face shields, gloves and boots).
  - Have separate clothing and equipment for each person using areas with livestock.
  - Note that biosecurity does not guarantee a *Campylobacter spp.*-free flock or herd at the time of slaughter.
- **Vector control** - although not the most important mode of transmission, vector control will help prevent/reduce flies mechanically transferring *Campylobacter spp.* to other animals.
  ►Section 3.4.3. Control of vectors
- **Fence stream banks and watering holes** to limit access by livestock to water contaminated by faeces from infected animals and to reduce animals contaminating water courses. Provide clean drinking water in separate watering tanks located away from potentially contaminated water bodies.
- **Sewage treatment** to reduce release of bacteria into water courses.
- **Chlorinate** contained drinking water sources and prevent faecal contamination of food and water where possible. Do not chlorinate natural water bodies as this will have an adverse effect on the wetland ecosystem.
- **Avoid mixing** potentially infected and susceptible pregnant animals.
- **Vaccination** can prevent abortions in sheep and may be used as prophylaxis for bovine genital campylobacteriosis. Note that vaccinated cows may remain carriers of the bacteria.
- Use of **artificial insemination** techniques rather than natural insemination can control or prevent bovine genital campylobacteriosis.
- **Antibiotics** may be used to treat some cases of enteritis and may also prevent sheep and cattle from aborting during an outbreak.



**If livestock are known to be infected with *Campylobacter spp*. they should not be allowed access to wetlands as this can pass on infection to other livestock, wildlife and humans. Fencing can be used and water provided in troughs (*James Lees*).**

**Wildlife**

*Campylobacter spp.* are carried by most mammals and birds and are commonly found in water sources. Disease is largely uncommon in wild animals therefore control measures are limited. To protect wildlife, wetland management should focus on reducing sources of human and livestock faecal contamination of wetlands.

► **Humans**
► **Livestock**

**Humans**

- **Appropriate slaughtering and meat preparation** processes can reduce the risk of contaminating carcases with bacteria and can decontaminate infected meat.
- **Avoid consuming unpasteurised** dairy products and eggs and untreated surface water. Other foods, especially meat should be cooked thoroughly and fruit and vegetables should be peeled or washed thoroughly with uncontaminated water. Prevent contamination of food in the kitchen.
- **Good personal hygiene** including washing hands thoroughly with soap and warm water: before preparing and eating food; after handling raw food; after going to the toilet or changing a baby's nappy; after contact with animals; frequently if you have symptoms such as diarrhoea.
- If campylobacteriosis is suspected, thoroughly wash all dirty clothes, bedding and towels in hot water. **Clean** and **disinfect** toilets, sinks and taps.
- Most people who have *Campylobacter spp.* recover without treatment. It is important to **drink plenty of fluids** as diarrhoea or vomiting can lead to dehydration and loss of minerals. Re-hydration solutions may also be useful. Antibiotics may be given to treat severe infections.

## IMPORTANCE

**Effect on wildlife**

*Campylobacter spp.* are not uncommonly found in most species of mammal and bird. However, the prevalence of infection in animals is much higher than the incidence of disease and many infected mammals and birds may not show any signs at all. That said, it can occasionally cause mortality in both taxa and may be of greater importance in hosts with con-current disease or subject to other stressors.

**Effect on livestock**

Whilst some infected animals may show mild signs such as diarrhoea, many will not show any signs at all. Mortality may be high in young farmed birds but low in older birds and adult sheep and cattle. Some infections may cause infertility and spontaneous abortion in sheep and cattle.

**Effect on humans**

Whilst most cases in humans are relatively mild, a small proportion may develop more severe illness. Death is rare in healthy individuals but may occur in cancer patients or those that have compromised immune systems. Worldwide, campylobacteriosis is responsible for around 5-14% of all cases of diarrhoea.

**Economic importance**

There is potential for significant economic losses to the livestock industry, with poultry particularly affected, due to illness of infected animals and likely trade restrictions imposed during and after an outbreak.

Illness in humans can result in significant economic losses due to the time lost from normal activities.

## FURTHER INFORMATION

**Useful publications and websites**


- World Organisation for Animal Health (OIE). **Chapter 2.09.03: *Campylobacter jejuni* and *Campylobacter coli***. Manual of diagnostic tests and vaccines for terrestrial animals. www.oie.int/fileadmin/Home/eng/Health_standards/tahm/2.09.03_CAMPYLO.pdf [Accessed March 2012].
- The Center for Food Security and Public Health (CFSPH)/ World Organisation for Animal Health (OIE). **Factsheet: campylobacteriosis**. http://www.cfsph.iastate.edu/Factsheets/pdfs/campylobacteriosis.pdf [Accessed March 2012].
- Jones, K. (2001). **Campylobacters in water, sewage and the environment**. *Journal of Applied Microbiology*, 90 (6): 68-79. www.bvsde.paho.org/bvsacd/cd29/campylob.pdf. [Accessed March 2012].
- Colles, F.M., Dingle, K.E., Cody, A.J. & Maiden, M.C.J. (2008). **Comparison of *Campylobacter* populations in wild geese with those in starlings and free-range poultry on the same farm**. *Applied and Environmental Microbiology*, 74 (11): 3583-90. http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2423018&tool=pmcentrez&rendertype=abstract. [Accessed August 2010].
- Vázquez, B., Esperón, F., Neves, E., López, J., Ballesteros, C. & Muñoz, M.J. (2010). **Screening for several potential pathogens in feral pigeons (*Columba livia*) in Madrid**. *Acta veterinaria Scandinavica*. 52-45. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2898782/?tool=pmcentrez&rendertype=abstract [Accessed June 2011].
- Wetlands International. **Wetlands & Water, Sanitation and Hygiene (WASH) - understanding the linkages (2010)**. http://www.wetlands.org/WatchRead/Currentpublications/tabid/56/mod/1570/articleType/downloadinfo/articleId/2467/Default.aspx [Accessed March 2012].
- World Health Organization (WHO). ***Campylobacter.*** www.who.int/topics/campylobacter/en [Accessed March 2012].
- Centre for Disease Control and Prevention (CDC). ***Campylobacter***. www.cdc.gov/nczved/divisions/dfbmd/diseases/campylobacter [Accessed March 2012].
- Wildpro**. *Campylobacter* infection**. http://wildpro.twycrosszoo.org/S/00dis/Bacterial/Campylobacter_Infection.htm [Accessed March 2012].


**Contacts**


- **WHO Communicable Diseases Surveillance and Response (CSR)**. zoonotic_alert@who.int, fmeslin@who.int and outbreak@who.int
- **FAO Animal Production and Health Division**. www.fao.org/ag/againfo/home/en/who.htm