

Clostridium

Food Act 2006

The genus *Clostridium* includes a group of bacteria that is widespread in the environment and frequently occurs in the gut of people and many domestic and wild animals.

The species *Clostridium perfringens* is a common cause of foodborne illness. It has also been known to cause serious wound infection, called 'gas gangrene'.

Botulism is a serious, potentially fatal foodborne illness caused when *Clostridium botulinum* toxins are formed in contaminated foods. It is the same bacterium used to produce Botox for clinical and cosmetic use. Foodborne illness caused by the *C. botulinum* toxin is rare in Australia.

Person-to-person transmission of *Clostridium* foodborne illness does not occur.

How does *Clostridium* cause foodborne illness?

Gastroenteritis (gastro) from *Clostridium* is generally caused by toxins that are released following ingestion of food that is contaminated with high numbers of bacteria. *Clostridium* are anaerobic bacteria (i.e. they grow without oxygen) and can form spores, which facilitate their survival in temperature-abused foods. The spores have a coating that allows them to survive cooking temperatures and dehydration of food. The heat from cooking activates *Clostridium* spores to transform into active bacteria once the cooked food cools.

Spores of *Clostridium* may be present in various animal or plant products contaminated by soil or faeces. Because of its widespread distribution, all foods can be a potential source, however it is generally associated with foods of animal origin.

Foodborne illness caused by *C. perfringens* primarily occurs when food is kept in the temperature danger zone (between 5°C and 60°C) for too long, particularly if cooling or reheating cooked food is not achieved rapidly. When large volumes of food are prepared and cooled too slowly, the large volume may contribute to anaerobic conditions and cause the internal temperature of the food to be in the danger zone for an extended period, providing ideal conditions for *C. perfringens* to multiply. This is particularly a problem in foods that are stored for periods in bain-maries at warm temperatures.

C. perfringens foodborne illness is almost always associated with cooked foods such as meats (mainly beef and poultry) and meat-containing products (e.g. gravies, stews, roast meats, pies and curries) being kept out of temperature control. It is less common in cured meats due to the combination of salts, nitrites and low water activity. *C. perfringens* has also been reported in acidified foods.

Homemade bottled, canned or fermented foods can be a source of foodborne illness caused by *C. perfringens* or *C. botulinum* so their preparation requires extra caution.

Internationally, spore-contaminated honey has been implicated with botulism in infants under the age of six months. However, in Australia, the source of infection in infants is often unknown. The *C. botulinum* toxin will not form in acidic foods.

Who is at risk?

Anyone can be affected by *Clostridium* foodborne illness, but certain people are at greater risk of severe illness, including:

- pregnant women
- infants and young children (under 5 years)
- older adults (over 60 years)
- people with weakened immune systems.

What are the symptoms of *Clostridium* foodborne illness?

Most people infected with *C. perfringens* will experience strong abdominal cramps and diarrhoea within 6-24 hours after eating contaminated food. Less common symptoms include nausea, vomiting and fever. Symptoms associated with *C. perfringens* foodborne illness are typically short in duration, subsiding within 24 hours.

Foodborne botulism is characterised by flaccid paralysis that can cause respiratory failure. Early symptoms include fatigue, weakness and dizziness, usually followed by blurred vision, dry mouth and difficulty in swallowing and speaking. These symptoms can be confused with signs of a stroke. Vomiting, diarrhoea, constipation and abdominal swelling may also occur. Symptoms in infants include constipation, increased weakness or floppiness, poor sucking and feeble ability to cry, loss of head control, breathing difficulties and paralysis. Symptoms of botulism develop usually within 12 to 36 hours of ingestion but can vary from a few hours to several days.

Prevention

The most effective way of preventing *Clostridium* foodborne illness is to prevent its growth in food. This can be achieved by:

- cooking food thoroughly and serving it immediately or keeping it hot (60°C or hotter) until serving
- when cooling cooked potentially hazardous food to be stored and used later, cool the food–
 - (a) within two hours - from 60°C to 21°C; and
 - (b) within a further four hours - from 21°C to 5°CHint: divide large amounts of hot food into small shallow containers to allow it to cool faster
- making sure your refrigerator temperature is at 5°C or colder
- reheating cooked food quickly with a microwave or stovetop (to 60°C or above)
- storing raw meats below ready-to-eat foods in the refrigerator or cold room to prevent cross contamination
- washing your hands with soap and drying them before preparing food and between preparing raw and ready-to-eat foods

- keeping your kitchen clean and ensuring all food contact surfaces are cleaned and sanitised before preparing food and between preparation of raw foods and ready-to-eat foods
- discarding packaged food if there are signs that indicate the food might be contaminated, including if the container or can is leaking, bulging or appears to be damaged or if the food or liquid is discoloured, smells bad, or spurts or foams when the container is opened. If in doubt, throw it out.

What to do if you suspect foodborne illness

If you suspect you have foodborne illness, seek medical advice.

A faeces (poo) sample may be required to confirm the presence of *Clostridium* species or the toxin it produces. *Clostridium* is not tested for by routine diagnostic laboratories. Samples should be sent to reference laboratories with the capability of investigating *Clostridium* food poisoning illness.

Diarrhoea can cause dehydration, so it is important to drink plenty of fluids.

If you have a concern about a food product or a food business, Queensland Health provides an online form to make a food complaint. This is available at <https://phconnect-foodcomplaints.health.qld.gov.au>.

Further information

For health advice, please contact your doctor or nearest health facility, or call 13 HEALTH (13 43 25 84).

For food safety advice and further information relating to *Clostridium* in food, contact your local Public Health Unit at www.health.qld.gov.au/system-governance/contact-us/contact/public-health-units.

The Food Pantry has advice related to food safety for food businesses and consumers at www.qld.gov.au/foodpantry.