



## CLOSTRIDIAL DIARRHEA IN ADULT HORSES

[Definition](#)

[Clinical Signs](#)

[Incubation Period](#)

[Risk Factors](#)

[Transmission](#)

[Diagnostic Sampling, Testing and Handling](#)

[Shedding of Virus Following](#)

[Resolution of Clinical Signs](#)

[Environmental Persistence](#)

[Specific Control Measures](#)

[Release of Animals from Isolation](#)

[Biosecurity Issues for](#)

[Receiving Animals](#)

[Zoonotic Potential](#)

### Definition

Clostridial diarrhea is caused by the gram-positive, anaerobic, spore-forming bacteria *Clostridium spp.* While the most common isolates are *C. perfringens* and *C. difficile*, multiple others, including *C. septicum*, *C. cadaveris* and *C. sordellii*, have also been associated with enterocolitis.

Clostridial bacteria are present in the environment and in feces.

In adult horses clostridial diarrhea has been associated with factors that may alter the balance of the intestinal flora such as the administration of antibiotics, feed changes, and transportation but can occur in the absence of any identifiable risk factors.

### Clinical Signs

- May occur as an individual case or cluster of horses with enterocolitis
- Diarrhea onset may be peracute (with rapid progression to death), acute, or gradual
- Diarrhea is often hemorrhagic, or dark and foul smelling but may have any appearance
- Colic
- Fever
- Reduced appetite or inappetance
- Septic shock
- Sudden death

### Incubation Period

Not known, as bacteria can be present in low numbers in normal equine intestinal tracts without any clinical signs; however, incubation periods of less than 24 hours with toxigenic *Clostridium* bacteria are possible.

Antibiotic-induced clostridial diarrhea usually occurs within the first week after initial administration.

### Risk Factors

Disruption of intestinal flora is thought to induce overgrowth of intestinal toxigenic clostridia, resulting in diarrhea. Factors associated with this include:

- Stress
- Hospitalization



### Transmission

- Surgery
  - Administration of antimicrobials
  - Sudden dietary changes
  - Deworming of horses having a heavy parasite load
  - Gastric acid suppression has been implicated in human beings and foals
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- Fecal-oral
  - Environmental

While clostridial bacteria are considered to be part of normal equine gastrointestinal flora, it is prudent to isolate any horse with acute diarrhea and take appropriate hygiene precautions. Outbreaks of clostridial diarrhea among horses and foals at farms and hospitals have been reported.

### Diagnostic Sampling, Testing and Handling

Definitive diagnosis of clostridial colitis beyond enterotoxigenic *C. difficile* and *C. perfringens* is difficult.

Culture alone is not diagnostic as clostridia are often present in the intestinal tracts of normal animals; however, antibiotic sensitivity patterns obtained from cultures may identify resistant strains (particularly to metronidazole).

#### *Shipping fecal samples*

\*Consult laboratory for testing capabilities prior to submitting samples

- Minimum sample. 1–2 grams of feces or intestinal contents
- Ship samples cooled on ice packs

#### *C. difficile* diarrhea diagnosis:

- Quantitative PCR fecal screening for Toxin A and B
- RT-PCR fecal screening for Toxin A and B
- ELISA detection of toxins in fecal sample
  - Test should detect Toxins A and B, as opposed to A only
  - *C. difficile* toxins are shed early in disease; a single sample is thought to be adequate
  - *C. difficile* toxins are stable in equine feces for many days if kept cool

#### *C. perfringens* diarrhea diagnosis:

- RT-PCR fecal screening (available toxin testing varies depending on laboratory)
  - Clostridium perfringens enterotoxin (CPE), Alpha (CPA), Beta (CPB Beta2 (CPB2), or necrotizing enterotoxin F (NetF) toxins
- Culture followed by PCR genotyping of the isolated *C. perfringens* to determine strain types can be useful in some circumstances; however, the relevance of identification of most types in diarrheic feces remains unclear



- Type C strains seem to be more highly associated with disease and less common in healthy animals
- ELISA testing is available to detect presence of *C. perfringens* enterotoxin, fecal samples

Testing for other clostridial causes of enterocolitis is very difficult. Standard anaerobic cultures can be performed, but most clinical laboratories are not adequately equipped for anaerobic investigations. Interpretation of results remain difficult as it is often impossible to determine whether a *Clostridium* present in a single sample is causing disease or simply resident microflora.

**Shedding of Virus Following Resolution of Clinical Signs**

Unknown; bacteria can be present in the intestinal flora and feces of normal horses.

**Environmental Persistence**

Clostridial spores are impervious to environmental conditions (including UV light, low and high temperatures and desiccation) but can be killed on very clean non-porous surfaces with chlorine bleach and accelerated hydrogen peroxides.

**Specific Control Measures**

Consider all diarrheic horses as shedding contagious organisms until proven otherwise.

Routine isolation and disinfection guidelines should be followed, including proper disposal of manure.

Clostridial diarrhea can cause increased bacterial shedding and toxin levels in feces. Bedding and manure should never be spread on pastures.

**Release of Animals from Isolation**

After clinically normal, preferably with negative results of toxin assays in previously toxin-positive adults and foals.

**Biosecurity Issues for Receiving Animals**

Routine isolation measures to prevent any contagious disease spread.

Alcohol-based hand sanitizers are ineffective. Use appropriate hand washing measures. Source: <https://www.ncbi.nlm.nih.gov/pubmed/20429659>

**Zoonotic Potential**

*C. difficile* is a known cause of diarrhea in humans and has been documented to be a nosocomial infection in human health care facilities. Infection of humans from horses is not documented but it is advisable to take hygiene precautions when working with any diarrheic patients.