

# CALF PNEUMONIA



Pneumonia, also known as shipping fever or bovine respiratory disease (BRD), is the second most common cause of calf death. Calves have very small lungs compared to their body size so any pneumonia episode will cause a certain degree of permanent lung damage, making it difficult for the calf to thrive. Calves most commonly get pneumonia after a period of stress (such as weaning, dehorning, castrating, or moving).



When stressed, a calf's immune response decreases, allowing viruses or bacteria to grow in the lungs and cause disease. Pneumonia is a very expensive disease due to decreased weight gain and increased treatment costs. Preventing pneumonia is the best option for superior calves.

## Pneumonia: Causes, identification, diagnosis, treatment and prevention

**What Causes Pneumonia?** Pneumonia is caused by viruses, bacteria or a combination of both.

**Viruses:** Most are rarely fatal by themselves, but they damage the lining of the lungs and cause decreased immune function which will allow bacteria to populate the lungs. Viruses usually affect the upper part of the lungs.

- **Bovine herpes virus** (also known as **infectious bovine rhinotracheitis** virus, or IBR)
  - Calves can recover from pneumonia but viruses remain hidden in the nose for the rest of the calf's life and will reactivate when the calf is stressed, thus infecting other cattle
- **Bovine viral diarrhea** (BVD) type 1 and 2
  - Calves infected with BVD before they are born are called persistently infected (PI) calves and will shed the virus continuously throughout their life
    - PI calves can look completely healthy but will infect other calves
    - Calves should be tested for PI status, and any PI animals should be culled
- **Bovine parainfluenza type 3** (PI3)
  - Causes very mild respiratory signs if no other infection but predisposes to secondary bacterial pneumonia
- **Bovine respiratory syncytial virus** (BRSV)
  - BRSV can cause severe and sudden pneumonia by itself
  - Cattle can be re-infected multiple times throughout their lives, as immunity is short-lived
- **Bovine coronavirus**
  - Causes diarrhea as well as respiratory signs
  - Becoming more common, especially when combined with *Mycoplasma*

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**What Causes Pneumonia?** Pneumonia is caused by viruses, bacteria or a combination of both.

**Bacteria:** Most are normal residents of the nose that descend into the lungs when a calf's immune system is jeopardized. Bacteria usually affect the bottom part of the lungs.

- ***Mannheimia haemolytica*** (used to be called ***Pasteurella haemolytica***)
  - Most common bacterial cause of pneumonia in feedlot calves
  - Severe, rapid and deadly pneumonia; if calves survive the initial infection, they often have chronic pneumonia
  - Lungs are usually covered in a thin yellow film, and the lung cavity is filled with a large amount of light yellow fluid
- ***Histophilus somni*** (used to be called ***Haemophilus somnus***)
  - Also causes brain and joint infections
  - Lungs are often red and thick with large pus pockets
- ***Pasteurella multocida***
  - Most common bacterial cause of pneumonia in dairy calves
  - Lungs are often red and thick with large pus pockets
- ***Mycoplasma bovis***
  - Also causes joint and middle ear infections
  - Respond poorly to standard antibiotic treatment resulting in chronic pneumonia
  - Lungs often have multiple small pus-filled bumps

### Identifying Pneumonia

#### Symptoms:

- Fever over 103.5° F
- Coughing
- Runny nose
- Neck outstretched with front legs held away from the chest
- Droopy ears
- Increased respiratory rate and/or noise
- Difficulty breathing
- Sudden death
- Open-mouthed breathing



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### How to Diagnose the Cause of Pneumonia

#### Deceased Calves

- Necropsy provides the best results; sections of lung should be sent to the diagnostic lab for further testing, as multiple pathogens are often involved

#### Live Calves

- **PI BVD:** Ear notch or blood sample
- **Nasal swabs:** Since most of the bacteria normally live in the nose without causing disease, this test provides limited results
- **Tracheal swabs:** Will show which bacteria have descended to the lungs, but should be gathered by a veterinarian
- **Antibody titers in blood:** Need two samples (one at the time of disease outbreak, the second 3-4 weeks later). Not beneficial in young calves that received colostrum, as they have antibodies from their mothers that would interfere with the results
- **Nasopharyngeal swabs:** better results than nasal swabs when a trained veterinarian collects the samples, as the protective guard bypasses the nose. Best for herd screening.
- **Thoracic ultrasound:** used to screen individual calves for subclinical pneumonia. For every calf with visible signs of pneumonia there are two others that look fairly normal but have lung damage. Ultrasounding can identify these calves and can be used to monitor treatment success as well. Speak with your veterinarian about this valuable service.



### How to Treat Pneumonia?

Regardless of the cause, all calves with pneumonia should be treated with an antibiotic as soon as possible. **Antibiotics will be most effective in the early stage of disease. Once a large amount of lung damage occurs, all antibiotics will fail.** Treatment should continue for at least 48 hours after symptoms have stopped. **The choice of which antibiotic to use is very organism and farm dependent, and should be recommended by your on-farm veterinarian following bacterial susceptibility results.** Calves with pneumonia also benefit from anti-inflammatory treatment.

### Metaphylaxis

Metaphylaxis refers to giving an antibiotic to an animal that is in the early stage of disease or is at great risk of developing pneumonia. An example of this would be giving an antibiotic at the time of movement. Metaphylaxis aims to prevent pneumonia by killing the bacteria before they reproduce and cause lung damage. It may not prevent all cases of pneumonia, but it has been shown to be beneficial and cost-effective.

An antibiotic that states it can be used for control of BRD can be used for metaphylaxis if there is a previous history of pneumonia at the time of stress. However, **certain antibiotics are illegal if used in an extra-label manner, which may include treating animals that are not ill.** Be sure to follow the manufacturer's directions for usage instructions unless you have been given specific directions by your veterinarian. Using antibiotics indiscriminately for metaphylaxis should never replace proper management and other preventative strategies.



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### How to Prevent Pneumonia?

- Calves should be born into a clean, dry environment and be given adequate amounts of good quality colostrum or colostrum replacer
- Calves need fresh, draft-free air at all times
  - Hutches provide the best air quality for pre-weaned calves
  - Positive pressure ventilation (PPV) systems work well for group housing and calf barns.
- Avoid stress as much as possible
  - Separate multiple stressors (such as weaning, moving, dehorning and castrating) by at least a week
- Keep bedding clean and dry
  - If your knee gets damp when you kneel in the bedding it is time to remove it and replace with clean bedding to minimize lung damage from ammonia.



### Vaccines can be helpful but DO NOT replace proper management

### How to Vaccinate to Prevent Pneumonia?

Vaccinate 10-14 days before a known stressful event to allow time for the body to mount an immune response to the vaccine.

- Modified live viral vaccines will provide the best and longest-lasting protection
  - Do not use on non-vaccinated pregnant or nursing cows as the live BVD portion of the vaccine can infect the calf, potentially causing a PI calf
- Killed virus vaccines can safely be given at any time but usually do not provide as long of protection
- Intranasal vaccines provide almost immediate protection from pathogens, but immunity is generally short-lived (around 7 weeks)
  - Can be given more often without harming the animal's immune system and can be given at the time of stress to aid in protection
- Always follow the vaccine manufacturer's directions

*\*\*Always consult your veterinarian if you have any questions or concerns about pneumonia causes, identification, diagnosis, treatment or prevention.*

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