

S  
l  
i  
d  
e  
  
1


**Contagious Bovine  
Pleuropneumonia**  
  
CBPP

Contagious bovine pleuropneumonia (CBPP) is a contagious respiratory disease of cattle, water buffalo, bison and yak.

S  
l  
i  
d  
e  
  
2

**Overview**

- Cause
- Economic impact
- Distribution
- Transmission
- Disease in animals
- Prevention and control



Center for Food Security and Public Health  
Iowa State University 2006

In today's presentation we will cover information regarding the organism that causes contagious bovine pleuropneumonia (CBPP) and its distribution. We will also talk about the economic impact the disease has had in the past and could have in the future. Additionally, we will talk about how it is transmitted and what the disease looks like in animals. Finally, we will address prevention and control measures for the disease if contagious bovine pleuropneumonia is suspected.


S  
l  
i  
d  
e  
  
3

**The Cause**

S  
l  
i  
d  
e  
  
4

**Contagious Bovine  
Pleuropneumonia (CBPP)**

- Caused by bacteria
- Extremely infectious in cattle
  - Causes lung disease
  - Occasionally causes joint disease
- Natural hosts are bovine and zebu



Center for Food Security and Public Health  
Iowa State University 2006

Bacteria are the causative agent of contagious bovine pleuropneumonia (CBPP). CBPP is extremely infectious in cattle, and causes lung and occasionally joint disease. The genus *Bos* including bovine (top photo) and zebu (a group of breeds of humped cattle found in India, East and West Africa, and Southeast Asia; bottom photo) cattle are the main hosts for CBPP. European breeds seem to be more susceptible than African breeds, and animals less than three years old are also more susceptible. Bison and yak have been infected in zoos, and infections have been reported in water buffalo. Wild cattle and camels are resistant. Photos courtesy of [www.carmenaquarterhorses.com](http://www.carmenaquarterhorses.com).

S  
l  
i  
d  
e  
  
5

**Importance**

CBPP is a threat to the U.S. because American livestock are naïve and it could have a huge economic impact.

S  
l  
i  
d  
e  
  
6

**History**

- 1693: First reported case of CBPP
  - Germany; spread all over Europe
  - Enters U.S. in a dairy cow from England
- 1884: CBPP widespread in U.S.
  - Federal government establishes Bureau of Animal Industry to combat CBPP
- 1887: Quarantine and slaughter begin
- 1893: CBPP eradicated from U.S.

Center for Food Security and Public Health  
Iowa State University 2006

The first reported case of CBPP was in 1693 in Germany. The disease then spread from Germany all over Europe, and eventually made its way into the U.S. via a dairy cow coming from England. By 1884, CBPP was so widespread and devastating that the Federal Government established the Bureau of Animal Industry (the forerunner of the USDA’s APHIS, Animal and Plant Health Inspection Service) in attempt to rid the country of the disease. The first intensive campaign to control an animal disease by quarantine and slaughter began in 1887 with CBPP, and the disease was successfully eradicated from the U.S. in 1893.

S  
l  
i  
d  
e  
  
7

**Economic Impact**

- Countries with high incidence of CBPP
  - Zambia, Tanzania, Botswana
  - Already desperate economic situation
  - High economic, social impact
- Rapid spread of disease
  - Vaccination programs reduced
  - Drought conditions
- Threatens social well-being, survival

Center for Food Security and Public Health  
Iowa State University 2006

CBPP spreads rapidly and can cross international borders. In countries that still have a high incidence of CBPP, such as Zambia, Tanzania and Botswana, the social and economic impact of the disease is substantial. With the difficult economic situation these countries already face, vaccination programs for CBPP have been reduced. In addition, drought conditions have led to the increased movement of animals, resulting in rapid spread of the disease throughout Africa. Depending on the country, farmers may not be compensated for their lost livestock, which threatens not only their livelihood but also their social well-being (Zambia), and even their survival (Botswana).

S  
l  
i  
d  
e  
  
8

**Distribution**

Next, we will discuss where CBPP is found and how severely it affects animals with the disease.

S  
l  
i  
d  
e  
  
9

**Geographic Distribution**

Center for Food Security and Public Health  
Iowa State University 2006

Contagious bovine pleuropneumonia is always present to a certain extent in Africa (shown in blue), and new cases occur at a high rate in Zambia, Tanzania, and Botswana (red). There are fewer cases in Spain, Portugal, Italy, the Middle East, India, and China (yellow), and it has been eradicated from the Western hemisphere, the UK and Australia (green).

S  
l  
i  
d  
e  
  
10

**Sickness/Death**

- Sickness
  - Increases with close confinement
  - Can reach 100% in susceptible herds
- Death rate
  - Ranges from 10-70%
  - Poor nutrition and parasites affect severity
- Some animals are carriers
  - Recovered animals capable of giving CBPP to other cattle without being sick themselves

Center for Food Security and Public Health  
Iowa State University 2006

Rates of sickness and death vary greatly for CBPP. Breed susceptibility, general health and management systems all influence the severity of infection. The chance of sickness increases with close confinement, and can reach 100% in susceptible herds. Death rate ranges from 10-70% and can be affected by secondary factors in overall health, such as poor nutrition and a parasite burden. Of recovered animals, as many as 25% may be carriers (recovered animals capable of giving CBPP to other cattle without being sick themselves).

S  
l  
i  
d  
e  
  
1  
1

**Transmission**

*Spread of the bacterium*

S  
l  
i  
d  
e  
  
1  
2

**Animal Transmission**

- Aerosol
  - Primary route of transmission
  - Breathing in infected drops from coughing animal
- Direct contact
  - Introduction of carrier most common cause of outbreaks
  - Infection from cow to unborn calf has been known to occur

Center for Food Security and Public Health  
Iowa State University 2006

CBPP is transmitted primarily two different ways or routes. One is by aerosol transmission. Close proximity is necessary for transmission, which occurs primarily through breathing in infected droplets from a coughing animal. The second route is direct contact. Direct contact by the introduction of a carrier animal into a susceptible herd is the most common cause of outbreaks. Infection from the cow to the unborn calf has been known to occur.


S  
l  
i  
d  
e  
  
1  
3

**Animals with CBPP**

S  
l  
i  
d  
e  
  
1  
4

**Clinical Signs:  
Acute Infections**

- Time period from exposure to signs of disease
  - 10 days to 6 months
- First signs
  - Lack of energy, lack of appetite, fever, cough
  - Increased breathing rate
  - Moaning while exhaling




Center for Food Security and Public Health  
Iowa State University 2006

The period of time from exposure to showing signs of sickness (incubation period) is highly variable, ranging from 10 days to six months. The time it takes to become ill depends primarily on how healthy the animal was to begin with. In adult animals, loss of energy, lack of appetite, fever (up to 107°F), and a drop in milk production are the first signs of CBPP. Early signs are followed by a cough which becomes moist if the animal is forced to move quickly. The signs progress to include pain in the chest, difficulty breathing, an increased breathing rate (up to 55 respirations per minute; normal is ~20 RPM), moaning while exhaling and reluctance to move. The photo depicts a coughing animal with neck extended (source: Foreign Animal Diseases: The Gray Book, [http://www.vet.uga.edu/vpp/gray\\_book/FAD/](http://www.vet.uga.edu/vpp/gray_book/FAD/)).

S  
l  
i  
d  
e  
  
1  
5

**Clinical Signs:  
Acute Infections**

- Neck stretched out while coughing
- Change in posture
  - Neck forward
  - Legs apart
  - Elbows turned out



Center for Food Security and Public Health  
Iowa State University 2006

A common clinical finding in an animal infected with CBPP is the neck outstretched when the animal is coughing as depicted in the photo. Also, it demonstrates that when the animal is standing, the usual posture is with the neck forward, the legs placed far apart, and the elbows turned out. Photo courtesy of [www.fao.org](http://www.fao.org).

CBPP

S  
l  
i  
d  
e  
  
1  
6

**Clinical Signs:  
Chronic Infections**

- Less obvious signs of pneumonia
  - Coughing with exercise
  - Extreme weight loss; recurrent mild fever
  - Recover after several weeks
- Calves infected when they are born
  - Arthritis in several joints
  - May not show signs of pneumonia
- Healthy appearing animals may spread CBPP


Center for Food Security and Public Health  
Iowa State University 2006

Animals that stay sick for long periods of time (chronic) have less obvious signs of pneumonia, but may cough with exercise. These animals are often thin due to extreme weight loss and may have a recurrent mild fever. They may appear to recover after several weeks. Calves born with infection commonly have arthritis in several of their joints with or without pneumonia. Joints may be warm and swollen and extremely painful. Animals that do not show signs of illness may still spread CBPP to other cattle.

S  
l  
i  
d  
e  
  
1  
7

**Clinical Signs:  
Chronic Infections**

- Depressed
- Reluctant to move
- Thin



Center for Food Security and Public Health  
Iowa State University 2006

Animals chronically infected with CBPP are often very thin and depressed, as shown above. They also may be reluctant to move. Photo courtesy of APHIS-USDA at [www.aphis.usda.gov](http://www.aphis.usda.gov)

S  
l  
i  
d  
e  
  
1  
8

**Actions to Take**

Contact your veterinarian  
Stop all animal movement

Center for Food Security and Public Health  
Iowa State University 2006

If you suspect a case or outbreak of CBPP, contact your veterinarian immediately and stop all animal movement.

S  
l  
i  
d  
e  
  
1  
9

**CBPP in Humans**

- Contagious bovine pleuropneumonia does not cause disease in humans

Center for Food Security and Public Health  
Iowa State University 2006

Humans are not susceptible to contagious bovine pleuropneumonia infection.

S  
l  
i  
d  
e  
  
2  
0

**Prevention and Control**

There are various prevention and control methods that can be applied to CBPP and those will be discussed here.

# CBPP

S  
1  
i  
d  
e

## Prevention

- Stop all animal movement
- Do not allow any animals to leave or enter your premises

Center for Food Security and Public Health  
Iowa State University 2006

To prevent CBPP from entering your farm, all animal movement on and off your premise must be stopped.

2  
1

S  
1  
i  
d  
e

## Control

- On-farm quarantine of exposed animals
- Slaughter infected and exposed cattle
- Bacteria present in saliva, urine, fetal membranes, uterine discharges
- Contaminate feed, water, environment
- Properly dispose of animals and contaminated material



Center for Food Security and Public Health  
Iowa State University 2006

As soon as an outbreak is suspected, animals that were exposed to animals with CBPP must be quarantined. Infected and exposed animals will likely be slaughtered. Bacteria are present in saliva, urine, fetal membranes, and uterine discharges which may contaminate feed, water or the environment. The animals and contaminated materials will need to be disposed of properly. Photo depicts a quarantine of a livestock farm, courtesy of Katie Steneroden, ISU.

2  
2

S  
1  
i  
d  
e

## Control

- Treatment not recommended
  - Antibiotics generally ineffective
  - Elimination of bacteria may be impossible
  - May result in extensive tissue damage
- Carriers may develop
  - Appear healthy
  - Capable of giving CBPP to other animals
- Vaccination not recommended

Center for Food Security and Public Health  
Iowa State University 2006

Treatment is recommended only in regions where CBPP is always present (endemic). Antibiotic treatment is generally not effective because it does not entirely eliminate the bacteria and may result in extensive tissue damage. The bacteria can remain in some animals (carriers) even though they appear healthy. They are capable of giving the disease to other animals. Vaccination is only recommended in countries where CBPP is always present- which does not apply to the U.S. The vaccine is not very effective and has adverse reactions.

2  
3

S  
1  
i  
d  
e

## Control

- Clean extensively
- Disinfect infected premises, equipment, and facilities
- Sodium hypochlorite (household bleach)



Center for Food Security and Public Health  
Iowa State University 2006

Clean extensively because the bacteria that cause CBPP may survive for a few days in the environment. Be sure to disinfect the entire premises including all equipment and facilities. Sodium hypochlorite (household bleach) may be used, and is prepared by adding 2 gallons bleach to 3 gallons water. Photo shows a typical disinfectant.

2  
4

S  
1  
i  
d  
e

## Additional Resources

- Center for Food Security and Public Health
  - [www.cfsph.iastate.edu](http://www.cfsph.iastate.edu)
- Food and Agriculture Organization of the United Nations (FAO) website
  - [www.fao.org](http://www.fao.org)
- Foreign Animal Diseases, The Gray Book
  - [http://www.vet.uga.edu/vpp/gray\\_book/FAD/](http://www.vet.uga.edu/vpp/gray_book/FAD/)
- USDA-APHIS website
  - [www.aphis.usda.org](http://www.aphis.usda.org)
- World Organization for Animal Health (OIE) website
  - [www.oie.int](http://www.oie.int)



Center for Food Security and Public Health  
Iowa State University 2006

2  
5

S  
l  
i  
d  
e  
  
2  
6

**Acknowledgments**

*Development of this presentation  
was funded by a grant from the  
USDA Risk Management Agency  
to the Center for Food Security  
and Public Health  
at Iowa State University.*



Center for Food Security and Public Health  
Iowa State University 2006

S  
l  
i  
d  
e  
  
2  
7

**Acknowledgments**

**Author:** Jean Marie Gladon, BS

**Co-authors:** Anna Rovid Spickler, DVM, PhD  
Kristina August, DVM  
James Roth, DVM, PhD  
Kristine T. Edwards, MA, DVM

**Reviewers:** Bindy Comito Sornsinsin, BA  
Danelle Bickett-Weddle, DVM, MPH

Center for Food Security and Public Health  
Iowa State University 2006