Bacterial bronchopneumonia is the most common cause of contagious respiratory infections in calves and adult cows. There are several bacteria capable of inducing pneumonia, but the most common organisms are Pasteurella multocida, Pasteurella hemolytica, and Hemophilus somnus.

These organisms may create disease individually, in cooperation with one another, or work in combination with viruses and mycoplasma organisms which will be discussed separately.

When bacterial pneumonia occurs in calves, it usually involves 10 to 80 percent of the calves on a farm and is termed Enzootic Calf Pneumonia. In adult cows, bacterial pneumonia is termed Shipping Fever and occurs in outbreaks that involve a high percentage of cattle on the premises.

Laymen and veterinarians called bacterial pneumonia Shipping Fever because it frequently developed in cattle shipped long distances, transported to shows and fairs, or assembled in sales or feedlots.

The signs of bacterial pneumonia include fever, coughing, nasal discharge, increased respiratory rate, depression, and decreased appetite. Inflammatory cells and exudates in the airways of the lungs cause abnormal sounds called “rales” as air moves into and out of the airways (bronchioles) of the lungs. These sounds can be heard only with a stethoscope and are important diagnostic signs for the veterinarian examin-
Bacterial pneumonia is often called Shipping Fever because it frequently develops in cattle shipped long distances.

ing calves or cows affected with bacterial bronchopneumonia.

The majority of the damage occurs in the lower lung area and, in severe cases, the infection results in consolidation or total destruction of the lower lungs. This results in chronic pneumonia, poor growth, or death in these severely affected animals.

**Spread by Air**

The organisms are spread from one animal to another through the air or through nasal discharges and coughing of infected secretions. This airborne transmission makes it easy for the causative organism to infect many cattle when they are confined to a barn or feedlot area. The infection rate is high if cattle are confined in a poorly ventilated area or a totally enclosed structure, since air movement and subsequent diffusion of organisms is reduced in these settings.

Fortunately, humans and other species of animals are not at risk from bacterial bronchopneumonias in cattle since each species (including man) tends to suffer from species-specific pneumonias.

This disease occurs all across the United States but...
Good ventilation will help eliminate ammonia fumes from urine and manure that can damage the cattle's normal defense mechanisms against respiratory diseases.

has a higher incidence in the mid-fall and early spring, when the weather is changeable, and especially in the cold months in the Northern United States since cattle are confined in smaller units or barns during these months.

The disease has a tremendous economic impact on cattle owners and consumers due to decreased production, drug costs for treatment, and mortality of affected cattle.

In beef animals, cattle affected with bacterial bronchopneumonia may grow poorly, need more time and feed to reach market weight, or may die. All these problems result in higher costs of beef for the consumer.

Treatment requires anti-
biotics to kill the causative bacteria, nursing care, well-ventilated shelter, and supportive drugs that may hasten recovery. Supportive drugs and antibiotics are selected by veterinarians based on their experience as well as specific cultures of bacteria obtained from affected calves or cows.

Cultures are obtained from the airways of affected live cattle or the lungs of cattle that have died from the disease. Antibiotics such as penicillin, tetracycline, sulfas and erythromycin may be used, but antibiotic selection should be at the discretion of the attending veterinarian.

When ventilation is poor, ammonia fumes from urine and manure build up and cause chemical damage to defense mechanisms of the lungs. Humidity also builds up and predisposes to cross infection through aerosol transmission. Unless ventilation is improved immediately, further spread of the disease may occur and affected animals may fail to improve following therapy.

Prevention is difficult since many predisposing factors such as transport of cattle, confinement of cattle, and grouping of calves and cattle are inevitable and necessary management components of the livestock industry.

Vaccines are available for some bacterial causes of pneumonia such as Hemophilus somnus and can prevent this disease if ventilation and management are good. Vaccines against Pasteurella pneumonias are controversial and most veterinarians agree that these vaccines cannot adequately protect cattle against Pasteurella—especially if management techniques or ventilation predispose to disease.

**Viral Diseases**

Viral infections of the respiratory tract in cattle occur frequently and damage tissue in the upper airway, trachea (windpipe), or bronchi and lungs. There are many known viruses capable of causing respiratory disease in cattle, and probably some viruses which are yet to be isolated or discovered.

Viral infection sometimes occurs before or in conjunction with bacterial pneumonia in cattle and is thought to predispose to bacterial pneumonia because it weakens the defense mechanism and lining tissues of the respiratory tract.

Because of this interaction of viruses and bacteria, the term Shipping Fever Com-
plex often is used to describe the myriad of organisms involved in an outbreak of respiratory disease in cattle or calves. This term is especially appropriate if management factors such as grouping, transporting, or poor ventilation for cattle are present in addition to bacteria and viruses.

Stresses created by management allow infections to develop more easily because cattle are weakened by these stresses. This is exactly like the situation in a human being when lack of sleep, driving long distances, or attending meetings where one encounters hundreds of other people predispose all of us to the common cold. This common cold is a viral disease but may develop into a bacterial pneumonia if we are further stressed or chilled.

**Specific viruses** that cause respiratory diseases in cattle include Infectious Bovine Rhinotracheitis (IBR, "Rednose"), Bovine Respiratory Syncytial Virus, Bovine Adenovirus, and Bovine Parainfluenza virus (PI3). All of these viruses cause high fever (105° to 108° F), depression, increased respiratory rate, nasal discharge, ocular discharge, coughing, and predispose to secondary bacterial pneumonias as discussed previously.

Without cultures of affected tissues it often is difficult to determine exactly which virus is involved. IBR does cause specific lesions in the nasal cavity, trachea, and occasionally the eyes, which allows a definitive diagnosis through inspection by an experienced veterinarian. Unfortunately, the other viruses cause symptoms that are hard to differentiate.

In all instances, however, the fever and signs of respiratory disease fail to respond to antibiotic therapy, and this fact alerts the veterinarian to a viral cause. Usually 10 to 50 percent of the animals on a premise will be affected, and transmission occurs by airborne or aerosol transmission from affected to non-affected cattle. Other species are not affected.

Treatment is supportive and may include drugs to reduce fever (aspirin), antihistamines, and antibiotics if a secondary bacterial pneumonia is suspected.

These viruses are of great economic importance since they result in treatment costs, poor growth or production, and deaths. Control and prevention are possible through vaccination for IBR and PI3.
and may soon be available for some of the other respiratory viruses of cattle.

**Mycoplasma**

Mycoplasma are microbes that are neither bacteria nor viruses but are intermediate in size and characteristics between bacteria and viruses. They can cause subclinical (undetected) or actual respiratory disease in calves and adult cattle.

Mycoplasma can be cultured from the lungs of many apparently healthy cattle and, therefore, the pathogenicity is difficult to determine. However, as part of the Shipping Fever Complex, mycoplasma have at least a role in respiratory disease.

When coupled with bacteria, viruses, or both, mycoplasma probably contribute to respiratory disease and complicate the problem. Occasionally, mycoplasma are the only organism isolated from outbreaks of pneumonia in calves, but usually mycoplasma and a bacteria are isolated and the combination of organisms is thought to add to the severity of disease.

Signs of disease may be mild in pure mycoplasma infections and include fever, nasal and ocular discharge, and a moist cough. In calves and growing beef animals, an infectious arthritis occasionally may be detected in one or more joints. Fever may not respond to routine therapy with antibiotics, but seldom is as high as that occurring in viral respiratory infections. When symptoms indicate a severe pneumonia, usually other organisms coexist with the mycoplasma.

Transmission is through airborne and aerosol mechanisms. Treatment should be directed at any associated bacterial organisms and include supportive therapy as well as improved ventilation. If mycoplasma is the only organism isolated, antibacterial therapy with tetracyclines or tylosine may be employed by your veterinarian.

No specific control or prevention exists for this problem, and the ubiquitous nature of the organism in cattle makes it likely that this organism will continue to be a component of the respiratory disease complex in cattle.

**Verminous Pneumonia**

A common parasitic pneumonia of cattle is caused by the lungworm, *Dictyocaulus viviparous*. The worm lives within the airway or bronchi in cattle and causes irritation to the airways. This irritation
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leads to exudates, fluids, and may predispose to secondary bacterial pneumonias.

Signs of verminous pneumonia include mild fever, a deep, moist, frequent cough, and a rapid respiratory rate. Chronic cases have labored breathing that may result in open mouth breathing. Rales can be heard over the entire lung area when the chest is listened to with a stethoscope.

Diagnosis requires a special technique called the Baermann technique which identifies larval forms of *Dictyocaulus viviparous* in the feces of affected cattle. This diagnostic test depends upon the fact that the adult worms in the lungs produce offspring, or larvae, which are coughed up from the lung, swallowed by the cow or calf, and then shed in the feces.

It follows that the disease spreads by fecal contamination of boxstalls, foodstuffs, or pastures, and oral ingestion by susceptible cattle. The parasite then penetrates the gut wall and migrates to the lung where it completes its development into the adult phase.

Moisture aids in propagation of the parasite. Thus swampy pastures, dirty boxstalls, or loose housing that allows manure buildup predispose to infection.

The parasite is not spread to other livestock or man. Levamisole, a modern anthelmintic, can be given orally or via injection to kill this parasite and control infection. Management controls such as fencing off lowlands or swampy areas, preventing fecal contamination of water and feed, or cleaning manure from boxstalls or loose housing areas are important adjuncts to vermicidal therapy.

Vaccines with irradiated *Dictyocaulus viviparous* larvae have been used successfully in endemic areas such as Great Britain but are not used currently in the United States.

Although *Dictyocaulus viviparous* infestation is an important cause of pneumonia in endemic areas, it is not as important as the infectious causes of pneumonia in cattle previously described.

Prevention of respiratory disease and pneumonia includes management principles, vaccines, and a program tailored individually for each farm or feedlot. This is best designed by active cooperation between the livestock owner and veterinarian in each case and a consideration of the type of cattle, type of management, geographic area, and climatic conditions.