Lung Protection Therapy *is* enhanced lung protection

- BRD can cause irreversible lesions in the lungs which affect both the growth of calves and their carcass quality [3-5]
- Lung Protection Therapy (LPT) is a treatment strategy designed to preserve lung function in one step
    - Treats infections due to common BRD pathogens
    - Rapidly reduces inflammation
    - Optimizes oxygen transfer across the lungs [7]
- LPT provides a visibly faster recovery by rapidly reducing fever
- Preserving the lung function of calves may reduce the economic losses associated with BRD [17]

LPT combines both antibiotic and NSAID in the treatment of BRD

Use LPT in BRD

Schering-Plough

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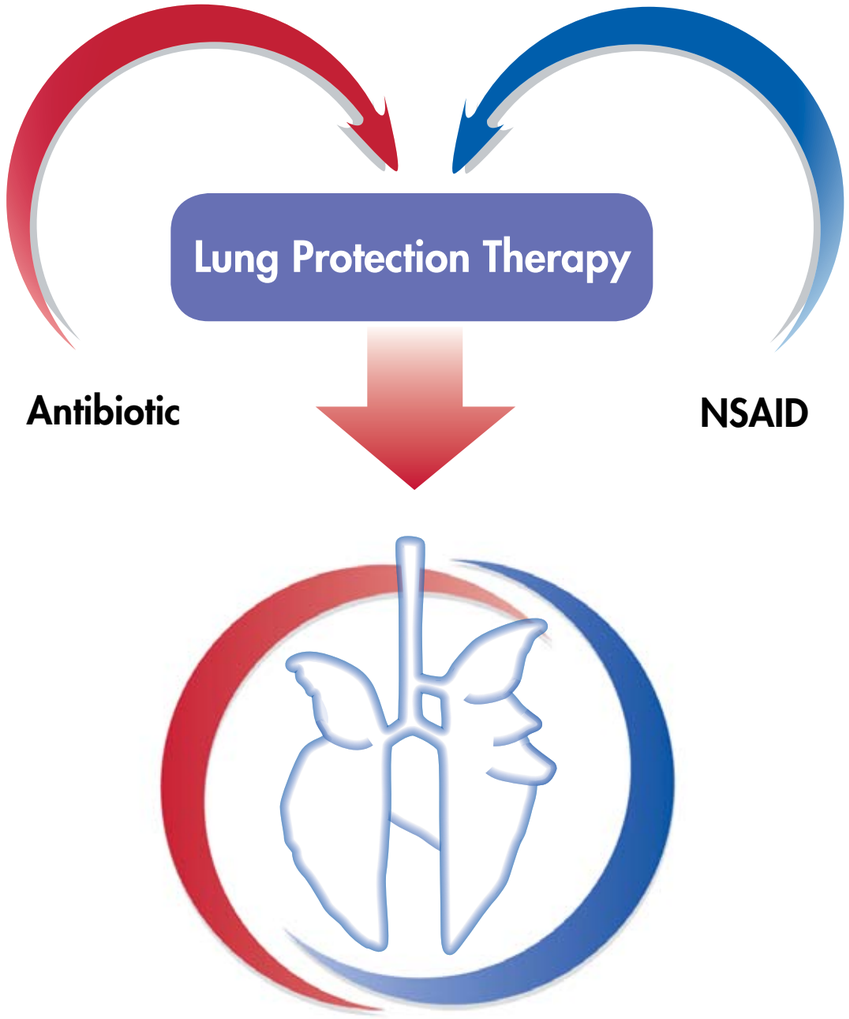
Save Cattle and Profits with Lung Protection Therapy

Do you have both sides of BRD covered?

Schering-Plough

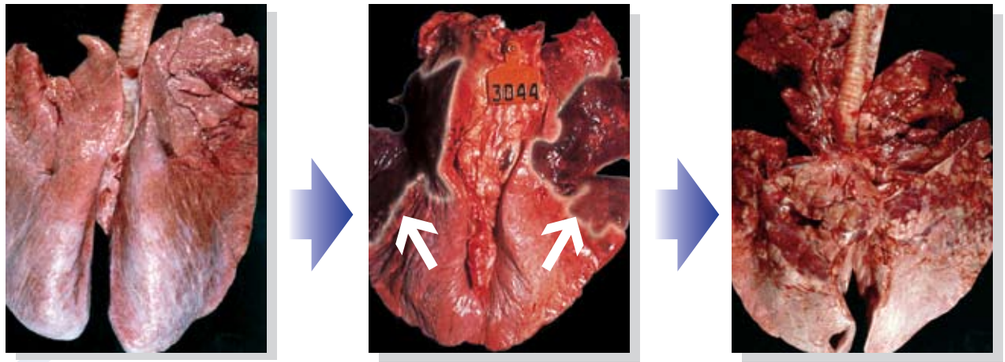
The principle of Enhanced Lung Protection in action



Healthier lungs

Bovine Respiratory Disease directly affects your profitability

- BRD is the most important cause of economic losses for the cattle industry [1] — losses estimated as high as $3 billion annually [2]
  - Morbidity and mortality [1]
  - Reduced growth performance [1]
  - More days on feed [3, 4]
  - Reduced beef quality [5]
  - Medical and manpower costs [1, 3]
- Once the lungs of cattle are infected, inflammation and bacterial toxins cause lesions to develop in the lungs [6,7]



Healthy lungs **Effects of pneumonia** **Irreversible damage**

- Lesions develop quickly and may cause irreversible damage to the lungs [6]

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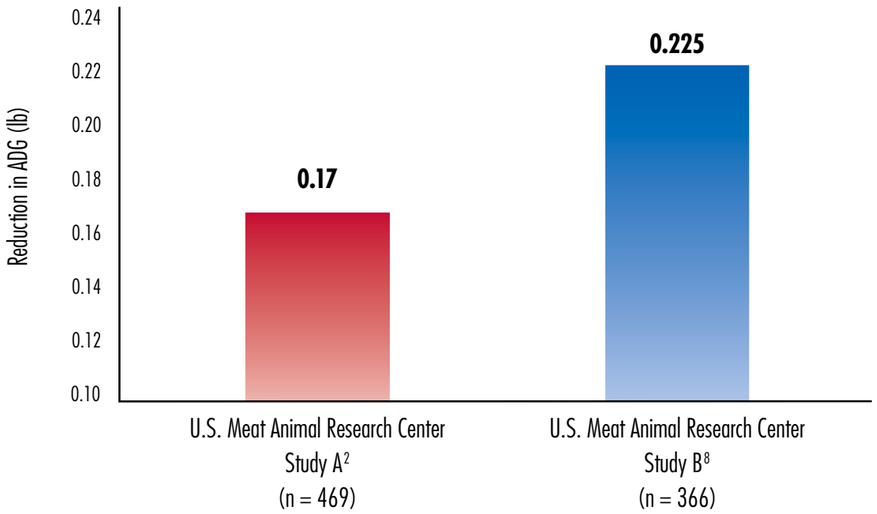
The lung lesions of BRD affect growth performance

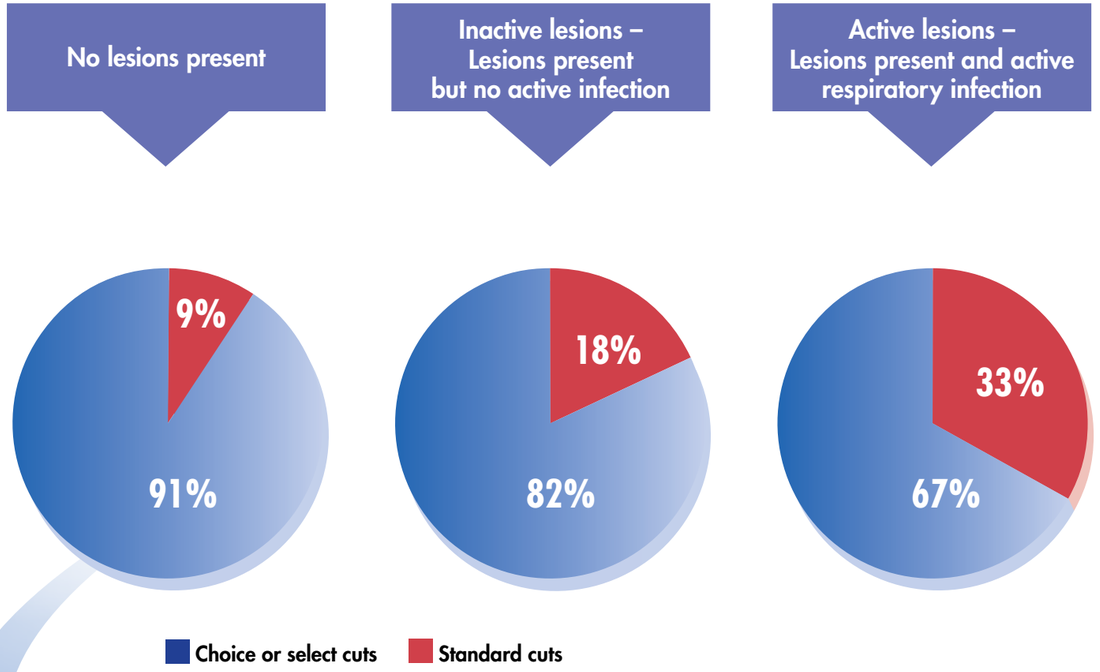
- The presence of lesions in the lungs at slaughter have been directly linked to the growth performance of calves
  - Reduction in average daily gain (ADG)[4, 5]
  - Reduction in weight at slaughter (p=0.001)[5]
  - Reduction in dressing percentage (p=0.021)[5]

The presence of lung lesions was associated with a significant reduction in ADG



The lung lesions of BRD affect quality grade

- The presence of lesions in the lungs at slaughter is associated with a reduction in carcass quality[5]
  - Less tender beef (p=0.05)[5]
  - Less marbling — less juiciness and flavor (p=0.009)[4]
  - Fewer high-quality cuts[5] — choice–select spread estimated at approximately $12 average for 2007[9]



n=204 steer calves. Lung lesions were present in 33% of all lungs at slaughter. Adapted from Gardner *et al.*[5]

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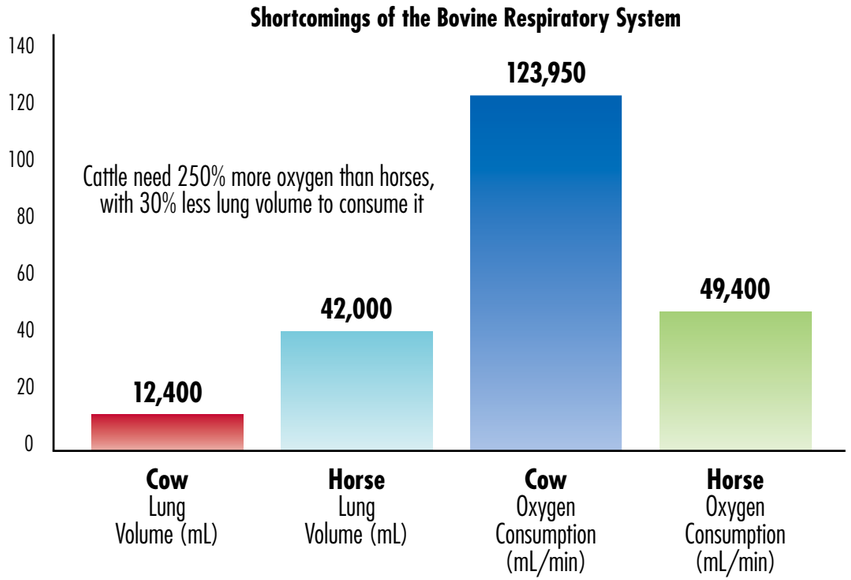
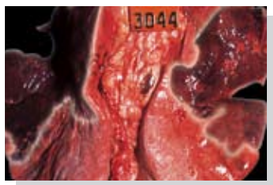
Why protection from lung damage is essential

- Physiologically, cattle are particularly prone to the development of BRD and lung lesions [10]





Effects of BRD

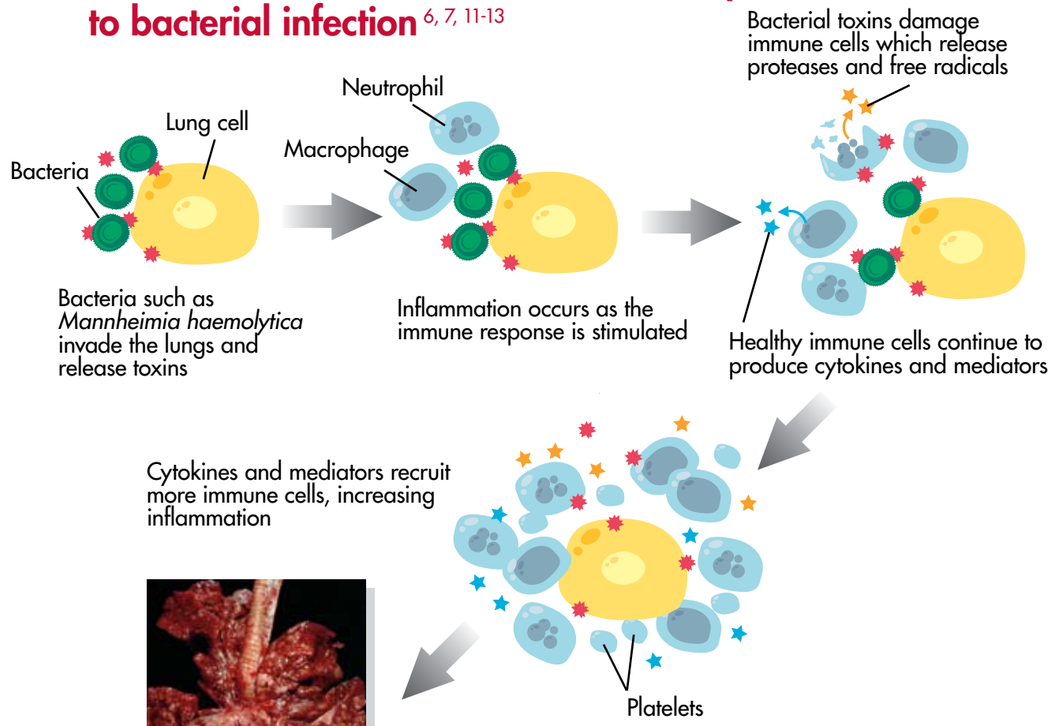
- The damage from these lesions can be irreversible [7]
- Even when clinical symptoms are not present during the infection, irreversible lesions can still develop [3, 4]

Irreversible damage

- Cattle's lungs are so under-sized, compared to their oxygen needs, that the animals cannot afford to sacrifice even a small portion of lung to lesions

Why antibiotics alone are not enough

Lesions are the result of the immune response to bacterial infection [6, 7, 11-13]



The presence of proteases and free radicals, and the progression of the inflammation cascade, causes lesions and irreversible lung damage

- The immune response may be more damaging than the infection itself
- In a study of 469 calves, treatment for BRD with antibiotics alone did not prevent significant production losses [3]
- Irreversible lung damage may be avoided by simultaneous control of bacterial infection and local inflammation [7]

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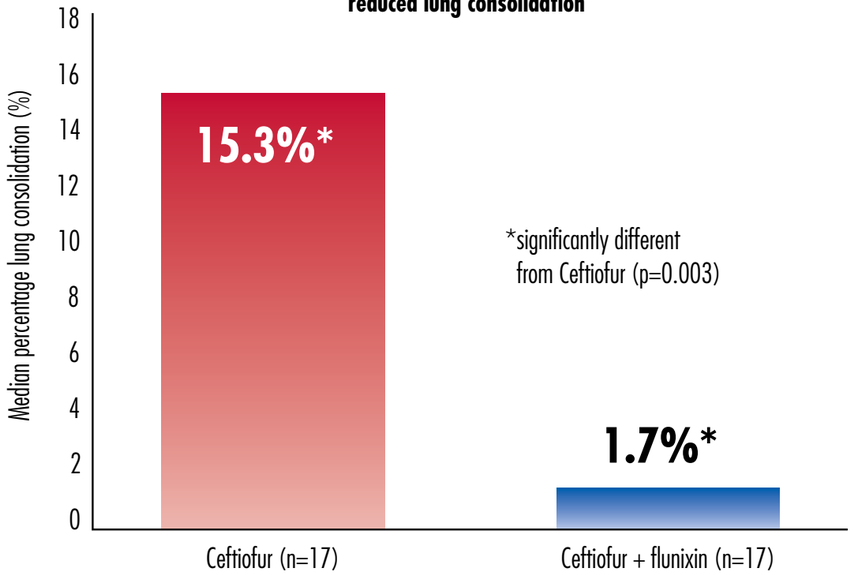
Effectively controlling the inflammatory response

- NSAIDs reduce lung consolidation and enhance response to antibiotic treatment[14]

The presence of a non-steroidal anti-inflammatory drug reduced lung consolidation

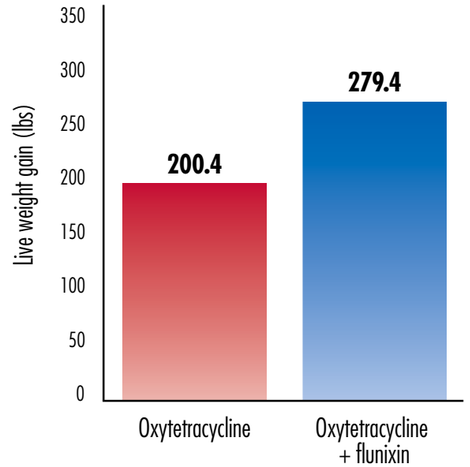


*significantly different from Ceftiofur (p=0.003)

Randomised study of 66 calves with a temperature of at least 104°F at inclusion. Ceftiofur dose 1.1mg/kg i.m., flunixin dose 2.2mg/kg i.v. Total percentage lung consolidation calculates as 0.1 (lobe 1+2, cranial and caudal segments of left cranial lobe) + 0.27 (lobe 3, left caudal lobe) + 0.05 (lobe 4 accessory lobe) + 0.3 lobe 5, right caudal lobe) + 0.08 (lobe 6, right middle lobe) + 0.2 (lobes 7 and 8, cranial and caudal segments of right cranial lobe). Adapted from Lockwood *et al.*[14]

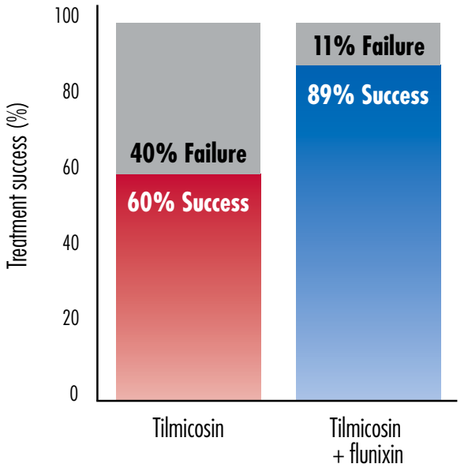
- Unlike corticosteroids, NSAIDs can exhibit an antipyretic response without suppressing the ability of the immune system to fight off viral and bacterial infections
- NSAIDs begin protecting the lungs within seconds after IV administration and continue to be therapeutic for two days

Presence of a non-steroidal anti-inflammatory drug improved performance even in severe cases of BRD



Housed calves with acute pneumonia; 150-day feeding period. Average difference in live weight gain between treatment groups was 41.8 pounds.[15]

Presence of non-steroidal anti-inflammatory drug increased treatment success and decreased treatment failure and relapse rates



Randomized study of 96 stocker calves assigned to one of 16 grass lots, with six calves per lot.[16]

- The optimal therapeutic strategy is, therefore, the combination of an antibiotic and an NSAID[7] to provide enhanced lung protection and a visibly fast recovery

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