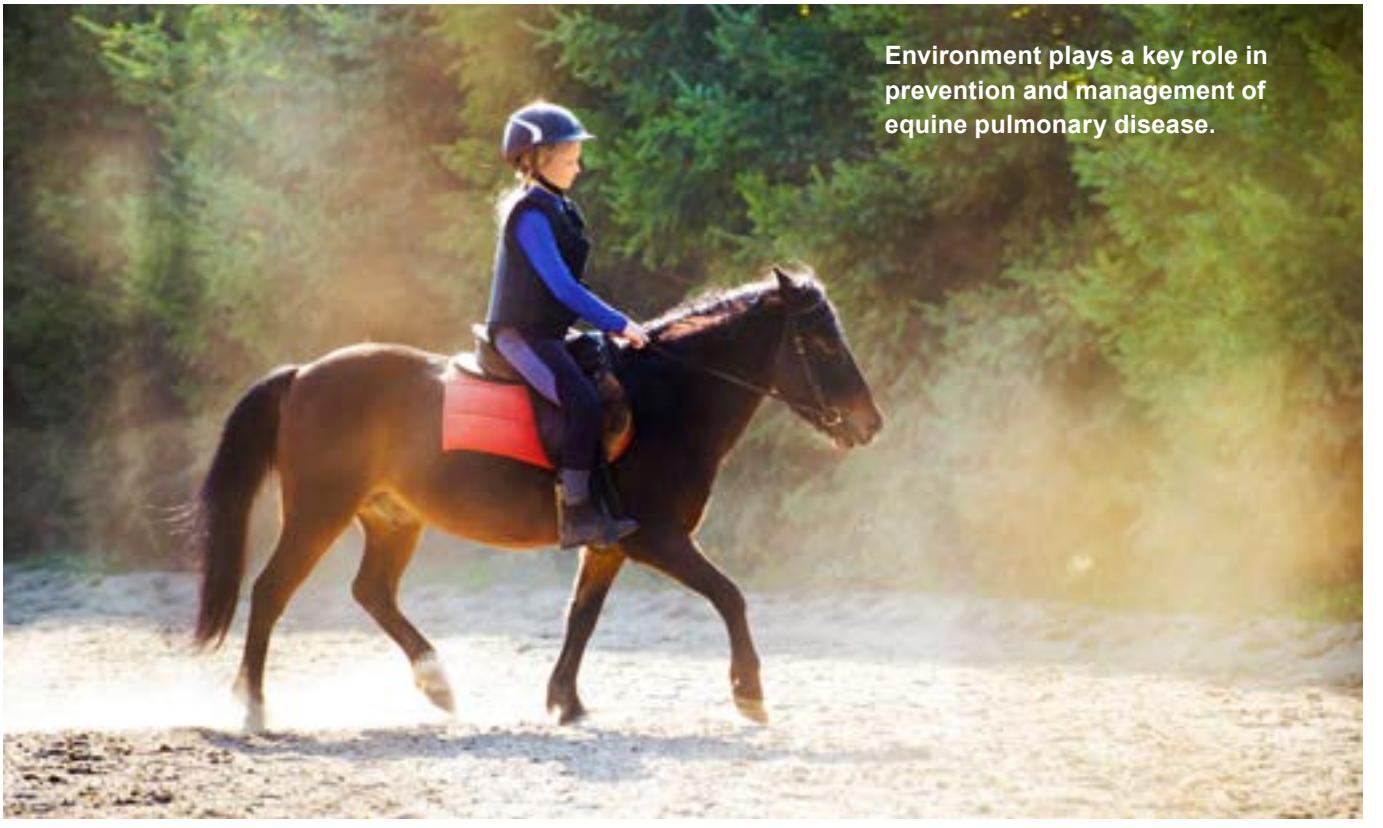

Environment plays a key role in prevention and management of equine pulmonary disease.

Treatment of Equine Pulmonary Disease

Following is information from the In-Depth Respiratory Disease presentation at the 2017 AAEP Convention.

By Nancy S. Loving, DVM

The in-depth respiratory disease presentation at the 2017 American Association of Equine Practitioners (AAEP) Convention included a discussion on treatment and management of pulmonary disease by Melissa Mazan, DVM, DACVIM, of Tufts University's Veterinary Medical Center. She struck off on her topic by stressing that environment plays a key role in prevention and management. These tips can help veterinarians assist horse owners in managing horses.

Particulate matter (inorganic and organic) and gases (ammonia) contribute to equine asthma, particularly in a stall environment. Dust comes from living and non-living things, she said, such as animal dander, mite debris, plant matter, sawdust, hay, manure, endotoxin, mold, and bacteria. Coarse particulates <10 microns usually are trapped in the upper airways, but can

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Even inorganic particulates act like foreign bodies to cause inflammation in horse airways.

lead to rhinitis; fine particulates <2.5 microns are able to disseminate into the lungs. She noted that particulates don't necessarily serve as antigens; even inorganic particulates act like foreign bodies to cause inflammation.

Endotoxin is respirable, and along with hay particulates and straw have the greatest inflammatory effects.

Mazan identified the most important factor for horses as the breathing space; in most cases, what occupies the breathing space is hay. In the center of a quiet stall, there is low particulate matter; in the breathing zone this is increased nearly 10-fold. With mucking, particulates increase even more. Hay nets also amplify exposure to respirable and inhaled particulates and endotoxin.

Feeding haylage rather than loose hay might decrease exposure by 60-70%; soaking hay decreases particulates by 50%; hay steamers result in fewer bacteria; and pelleted complete feed reduces particulates by 70-90%, especially if moistened.

With proper management, the barn itself can be modified to decrease airway exposure by up to 50%. The type of bedding used has a significant effect, with straw the worst component to use. Shavings are better, but pasture turnout is best. In a stall, dust can be

as high as 0.9 ml/m3 as compared to 0.1 ml/m3 in an outdoor environment that has infinite air exchanges and fewer respirable spores.

Hay stored over stalls and/or the presence of an indoor arena at one end of the barn contributes a maelstrom of dust, hay and mold spores circulating in the barn environment, said Mazan. She suggested looking at oil bottles, cobwebs and stall bars to see just how much dust circulates and deposits on these surfaces.

She mentioned other activities that increase barn dust:

- Stall cleaning – air particulates last for hours
- Activity in adjacent stalls
- Sweeping
- Leaf blowers
- Individual horse activity
- Effects of season dependent on whether windows and doors are open or closed
- Poor ventilation

The living environment is not the only condition that affects equine airways. During exercise, horses breath 1,500 liters/minute, with particles impacting the lungs. With exercise, the nostrils open, airflow increases, and turbinate blood vessels shrink so more air passes into the lungs. Exercise itself creates more dust that can enter the lungs. Riding activities in arenas move dust that circulates small particles into the air, including bacteria.

Head position, such as bending the head, amplifies turbulence in the airways that could favor deposition of particulates. Normally, a horse's nose is a good "scrubber" due to its length and well-vascularized turbinates, but head position can reduce its efficiency.

Recommendations to decrease airway impact during daily living and exercise include putting doors between stalls and arenas and deep watering (down to two inches) of arena footing


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Many activities increase barn dust; air particulates last for hours after stall cleaning.

(which decreases dust by 90%). Hygroscopic magnesium chloride, coating agents and water-absorbing particles help keep dust down. Air quality is also improved by using larger particle footing, such as washed sand and/or adding rubber or wood, especially if dampened. Mazan advised riders to pay attention to the arena base to avoid "fines" that could circulate into the air with exercise.

She noted that RAO horses are often able to improve without medications when moved to a low-dust environment. Omega-3 fatty acids (DHA) confer added protection to low-dust environments.

The best effects are seen if airway-challenged horses are put out to pasture for the long term. As one example of barn environmental effects on people, she described a study in which 100 people spent more than two hours a day in the barn compared to controls who did not. Barn exposure resulted in 55% of people reporting respiratory symptoms compared to 15% of the control individuals. Horses often reside in a barn for 20 or more hours a day, so the impact on the airways is significant.

In cases where pasture is not available, in addition to environmental management and switching to pelleted feed, medications might be needed, such as corticosteroids and/or bronchodilators. These can be aerosolized by nebulizers or through metered dose inhalers, or given systemically.

Anti-inflammatory medications and bronchodilators are important for airway control, especially when used with an Aeromask or something comparable.

Albuterol (salbutamol) has a rapid onset, but does not last long when inhaled in the lung. The oral form is not well absorbed.

Salmeterol is long lasting, but takes 30-60 minutes for onset.

A combination of fluticasone and salmeterol (Advair) decreases airway neutrophils and extracellular matrix remodeling.

Levalbuterol lasts longer (up to two hours) while also decreasing wall edema, mast cells and eosinophils.

Ipratropium is useful for RAO and can be combined with albuterol. Its effects last up to six hours.

Oral clenbuterol increases mucociliary transport and bronchodilation, but because it has reduced efficiency and is associated with a rebound after three weeks, it is meant only for short-term use.

Prevention of airway disease is always the best choice to maximizing performance of the equine athlete. Many of the same measures used for prevention are also effective techniques for treatment and management. EM