



Air Hygiene and Coughing

Horses and ponies in the UK spend a large proportion of the year stabled. During the winter many animals are stabled continuously except when exercising, as a result they are exposed to a wide range of respiratory pathogens.

Air Hygiene and Particles

Air hygiene refers to the levels of airborne particles in the stable, which are small enough to reach the lower respiratory tract. These particles are less than 5µm, and are thus invisible to the naked eye!! They are referred to as **respirable particles**. These consist of:

- **Allergens:** moulds, fungi, forage mites and their faeces, pollens
- **Pathogens:** bacteria and viruses
- **Irritants:** plant fragments and other dusts, ammonia and other noxious gases.

Stable management and design both influence stable air hygiene. Although changes in stable management are usually considered in treatment and preventative regimes, improvements in stable design are often overlooked. Management changes (changing to low dust beddings and feedstuffs) do improve air hygiene. If the design of the stable is poor, there may still be excessive levels of airborne particles in spite of other management changes.

Effects of poor air hygiene

Symptoms that your horse is suffering through poor air hygiene can vary, but the most common ones are coughing (particularly at the beginning of work), nasal discharge, heaves, lethargy, or in mild cases poor performance.

Recurrent Airway Obstruction (RAO) is the correct name for this disease, but more familiar names for this disease are COPD, asthma, hay fever, heaves, broken wind or dust allergy. The disease can often be confused with respiratory infection and infections will often initiate or complicate RAO. If you notice any of these symptoms your horse should be examined by us.

RAO is primarily an irritant and allergic phenomenon, and thus entirely environment dependent. The most common allergens are moulds in hay or straw. However, barn dust, pollens and a wide variety of other substances may trigger spasms of the small airways. The key is to determine the inciting causes and avoid them if possible. **Infections** may take much longer to heal if the horse is kept in an environment with poor air hygiene.

Throughout your horse's life, you should strive to keep the amount of respirable particles to a minimum. If more than a certain number of these particles are present, disease occurs. This threshold can vary between animals and can vary during the life of an animal. For example, irritants and allergens tend to cause problems in lower concentrations as the horse gets older. Conversely, infections are more prominent in younger horses. By keeping the respirable particles as low as possible, problems in later life can be avoided. Some suggestions on keeping dust in your horse's environment down are discussed below. In known RAO sufferers, all measures may have to be taken.

What needs doing if you have a coughing horse?

Initially, provide clean air. Signs that the condition may need veterinary intervention include wheezing, constant coughing, rapid shallow breathing or heaving – where a line appears along the bottom of the rib cage at the intake of each breath – and thick nasal discharge. Some owners have learned to accept that their horse always has a few coughs at the beginning of work. Make no mistake, this is an early sign that all is not well in your horse's lungs! Leaving it untreated may only cause more hassle in the future.

A horse suffering from acute symptoms should be turned out into a dust-free, airy space such as a paddock, kept quiet and closely observed.

Call your vet immediately if

- The horse is really gasping and does not improve within the hour
- The horse has a temperature, this could indicate an infection
- If there is severe coughing that will not stop – this may indicate a blockage in the gullet or airway

POOR AIR HYGIENE

Increases susceptibility to respiratory disease.

Increases the severity of respiratory disease.

Delays recovery from respiratory disease.

- If there is a new loud roaring/snoring sound
- If the horse has had a recent chest injury

Younger horses are more likely to suffer from infections, which require drug treatment early to prevent them to have damaged lungs for the rest of their lives.

A closer examination, possibly involving passing an endoscope to examine the inside of the airways, may be suggested to help find a longer-term solution. Many cases are reversible with aggressive treatment, particularly through good dust-free management. Horses below 8 years old that show the above signs, or have a long-lasting cough should always be examined by a vet, and further diagnostics should be instigated if simple treatment has no effect.

Treatment for coughs may involve antibiotics, bronchodilators (Ventipulmin), Mucus thinners (Sputolosin) and anti-inflammatory drugs (usually Steroids). These drugs can be injected or given in the feed. Recently, success for long-term sufferers has been achieved with inhaled medication. Horses seem to tolerate the masks that are needed to make the "puffers" work for them. Inhaled therapy has the advantage of creating less side effects, compared to traditional medication.

"Dry hay and straw provide the ideal environment for your horse to contract respiratory disease"

STABLE MANAGEMENT

Forage

Hay that has been baled with a high moisture content spontaneously heats and provides the conditions in which prolific mould spores develop. A horse eating hay inhales millions of spores with each breath. Surveys have shown that up to 70% of hay fed to horses contains significant levels of mould contamination. Unfortunately, a horse's eye and nose is not a good guide to the quality of hay, even if they are very experienced.

Soaking the hay decreases the respirable challenge of spores. Spores can become airborne if the hay is allowed to dry out before it is fed. Old soaked hay, trampled in the bedding, can result in respiratory disease in horses that are otherwise kept in very clean conditions. The hay should be thoroughly wet throughout. Allowing it to soak in clean water for at least half an hour can do this. After soaking for longer than three hours, nutrients may be washed out of the hay. Steaming the hay is very ineffective in reducing respirable particles.

Even better dust control will be achieved by feeding one of the following forages, and many affected horses may need these instead of soaked hay. Complete **cubed diets** or **chaffs** offer alternative, albeit expensive, ways of meeting your horse's forage needs. Alfalfa cubes, which act as a good nutritional balance with oats, help to avoid the necessity of feeding hay. **Haylage** or some commercial products such as Horsehage, Propack, Alfalfa, Hifi are minimum dust hay-alternatives. Care should be taken if big bale haylage is used. Broken or damaged bags of silage containing dirt or having an ammonia smell should be discarded because of the risk of botulism. Bags should be used within 5 days of opening, especially in warm weather when it will mould quickly.

BEDDING MATERIALS

Straw is a particularly potent source of mould spores capable of causing COPD. "Clean" alternatives to straw include wood shavings, peat, sawdust, shredded paper and synthetic bedding.

Straw has almost 100 times more particles in it than woodchip. Dust-extracted woodchip is better than normal chips. Clean straw, or even woodchip, under conditions of deep litter management or in hot, humid, poorly ventilated stables, may leave a potent source of respirable mould spores. The other risks of deep litter are a build-up of worm larvae and noxious gases along with accumulations of bacteria, capable of causing primary and secondary infections.

TURN OUT

If your horse is not sensitive to pollen, the healthiest environment for it is usually outside. Pollution from exhaust fumes and industrial gases has made this environment less healthy than some years ago. Frosty weather is more beneficial than warm conditions. Horses cope well with the cold and an extra rug will protect them against the elements.

Winter turnout with a lot of hay in varying states of decay is not ideal for RAO sufferers

OTHER MANAGEMENT CONSIDERATIONS

Keep **muck heaps** and horses as far apart as possible, because the fumes and moulds produced on these are phenomenal. Put your bed down at least half an hour before putting the horse into the stable to allow the dust to settle. When possible, the horse should be **groomed** outside, so that it is not made to breathe in the dust created by brushing it. **Storage of hay and straw** should be far away from where the horse is kept. Very bad respiratory conditions can be encountered after horses are inhaling smoke from **bonfires** and burning should happen a great distance from horses, if at all!

Stable Design

Respiratory particles can remain airborne for days and are only removed by adequate ventilation. Poor drainage leads to high levels of ammonia and other noxious gases, but also increases the rate of moulding of bedding. It is important to remember that clean bedding will become heavily moulded in poorly drained/ventilated stables and will contaminate stable air as badly as straw.

Sky lights and windows allow sunlight, a potent killer of bacteria, viruses and other microbes, including worm larvae, in stables. Ultraviolet translucent glass or plastic is preferred to normal glass. As a general guideline the skylight should make up 10% of the roof area. Increasing daylight is the primary factor that initiates the loss of winter coats and stimulates mares to commence cycling.

Ventilation

In a stable with clean forage and bedding, there is little advantage in having a ventilation rate greater than eight

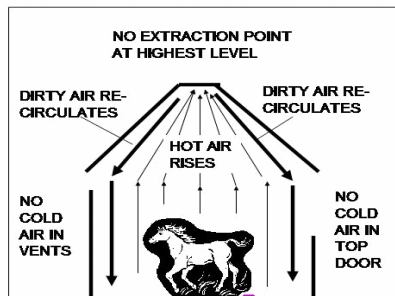
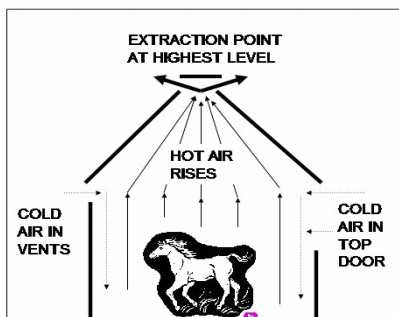
air changes per hour. In the vast majority of stables this can be achieved by natural forces of ventilation.

Stack effect air warmed by horses rises and leaves the stable, so long as the provision is made for a high extraction point.

Aspiration wind blowing across the top helps draw stale air out of the building.

Perflation wind blowing from end to end of a building aids ventilation.

Properly placed and adequately sized wall and roof vents are essential to make full use of these forces. Slatted arrangements as seen in cattle barns are also excellent. The minimum inlet recommended area is 0.4m²/horse. Outlet chimneys or roof vents may be adjustable. The minimum outlet area recommended is 0.2m²/horse, airflow into the stables with overhanging roofs at the front may be improved by removing cladding from the overhang. Positioning the stable to make best use of



prevailing wind direction will aid airflow.

Walls and ceilings should ideally provide insulation to reduce condensation and should be constructed from brick or a double layer wood partition with an air gap.

The roof heights should be sufficient to provide an air volume of at least 40m³ per horse. An insulated roof facilitates the stack effect, because it avoids cooled, contaminated air to sink back into the stable. Floors must be impervious (ideally concrete) and sloped to allow drainage from the stable.

Modifications to traditional stable designs have generally resulted in poor air hygiene in **modern stables**. The erroneous fear that ventilation cannot be achieved without producing draughts has meant that ventilation is often half of the recommended 8 air changes per hour. Furthermore, many of the roofs in prefabricated wooden stables are too low. As a result most modern stables have at least 3

times the maximum levels of respirable particles recommended for humans and at least twice the maximum concentration of ammonia recommended for animals. In stables where deep litter, dusty and moulded bedding and feedstuffs are used, the concentration of particles and noxious gases is higher still. Tin roofs cool the air down too quickly, which means that it drops and is re-circulated in the stable

ACHIEVING ADEQUATE VENTILATION

Stables with pitched roofs

A chimney (or covered opening in the ridge) to provide outlet

Two openings, one in front and one in the back, to provide air inlet. These should ideally be at head height to prevent draughts and the front opening must be additional to the top door of the stable.

Stables with a sloping roof

Create an opening in the front and back wall. The inlet is the lower opening and the outlet is the higher opening.

Barns

Air mixes poorly in large air spaces and the stack effect operates with difficulty because air cools before it reaches the outlets.

Multiple chimney outlets (or an open capped ridge) and inlets are required to try and provide adequate air movement in barns. It may sometimes be necessary to use mechanical ventilators to extract air out of the barn.

Stables with shared air space between horses are better to create ventilation and air movement, but will result in a dirty bed of one horse being shared between all of them. Infections are more likely to be spread between horses in a stable with common air space.

CONCLUSION

If you are lucky enough to build new stables, ventilation should be paramount in the design. Many existing stables can be improved to be more healthy. Care about what your horse eats and its bedding should lead to more healthy horses. There is no sense in waiting for your horse to develop disease before making some of those changes in management. If you want to enjoy your horse for as long as possible, and your horse to enjoy its life for as long as possible, START TO PROVIDE CLEAN AIR TODAY.

RAO and infectious lung problems can be avoided or treated by providing clean air. Do not accept coughing as a normal part of your horse's life. Treatment, particularly of young horses is vital to avoid long-term consequences.