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[Equine Vet J.](#) 2012 Apr 12. doi: 10.1111/j.2042-3306.2012.00568.x. [Epub ahead of print]

Local airborne particulate concentration is associated with visible tracheal mucus in Thoroughbred racehorses.

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Abstract

Reason for performing study: Accumulations of tracheal mucus assessed by endoscopic examination are associated with poor performance in racehorses. The air quality in horses' stalls may contribute to this visible tracheal mucus. Objectives: To determine whether the concentration and number of airborne particulates in stalls are associated with visible accumulations of tracheal mucus and with the number of inflammatory cells in tracheal aspirates. Methods: We studied 107 racehorses from 3 stables, in 3 different months, and measured airborne particulate matter 3 times daily in each of the stalls. On each monthly visit, horse airways were examined endoscopically and assigned a mucus score, and tracheal lavage was performed. Bivariate procedures, general estimating equations and linear mixed models were applied to estimate the association between PM and the presence of accumulations of mucus and number of inflammatory cells. Results: Stable, stall, month and PM were all significantly associated with the presence of accumulations of tracheal mucus, which had an overall prevalence of 67%. The odds of horses having visible accumulation of mucus were increased when horses occupied enclosed stables or stalls with higher particulate concentrations, and when concentrations of larger particles ($\leq 10 \mu\text{m}$ in diameter) were elevated. Sixty-eight percent of tracheal wash samples contained more than 20% neutrophils. Increased numbers of neutrophils were associated with the concentration of smaller particles ($\leq 2.5 \mu\text{m}$ in diameter). Potential relevance: Careful consideration of stable construction and management practices focused on maintaining the lowest possible dust concentrations throughout the day should reduce the prevalence of visible accumulations of tracheal mucus, potentially improving racing performance.

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PMID: 22494157 [PubMed - as supplied by publisher]