Tracheal Mucus and Breathing Zone Exposure to Particulate Matter in Racehorses: A Case–Control Study

Melissa L. Millerick-May, MSc, PhD; Wilfried Karmaus, MD, Dr. Med, MPH; Frederik J. Derksen, DVM, PhD; Brett Berthold, DVM; and N. Edward Robinson, BVetMed, MRCVS, PhD

As determinants of airway mucus, area (background) concentrations of particulate matter (PM) in racing stables are more important than individual horse behaviors that generate focally high concentrations of dust. For this reason, low dust management practices should be implemented. Authors' addresses: Department of Large Animal Clinical Sciences, Michigan State University, East Lansing, Michigan 48824 (Millerick-May, Derksen, Robinson); Cleveland Equine Clinics, 3340 Webb Road, Ravenna, Ohio 44266 (Karmaus); and Arnold School of Public Health, 800 Sumter Street, Columbia, South Carolina 29208 (Berthold); e-mail: milleric@cvm.msu.edu. © 2009 AAEP.

1. Introduction

Previous measurements by our laboratory of background airborne particulates in stalls of racing stables did not account for dust generated as a result of individual horse activities such as eating, stall walking, or rolling. To account for these activities, we measured breathing-zone particulate exposure in horses without tracheal mucus (MS = 0) and with tracheal mucus (MS ≥ 2) sufficient to impact performance.

2. Materials and Methods

Over 7 mo, 653 racehorses (six stables) were endoscopically examined and assigned a mucus score. Cases (MS ≥ 2) and controls (MS = 0) were age matched monthly and fitted with personal (PM10) monitors that measured breathing-zone exposure on an average of 17.5 h/day. Bivariate procedures and conditional logistic regression determined the difference in breathing-zone exposure between cases and controls.

3. Results

Overall prevalence of MS ≥ 2 was 23% from April to October in 2006. Trainer and month had a significant effect on the prevalence of MS ≥ 2, and month had a significant effect on breathing-zone PM concentrations. The overall breathing-zone PM10 exposure did not differ between cases and controls over the 17.5-h measurement period.

4. Discussion

Given that the presence of tracheal mucus is significantly associated with background PM exposure and that overall breathing-zone exposure did not differ between cases and controls, we suggest that the dust generated by differences in individual horse behaviors does not contribute to the risk of tracheal mucus.