Assessing volunteer workers' exposure to dust, metals, and bioaerosol during equine assisted activities/therapies

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Background

Equestrian facilities represent microenvironments with multiple sources of air contaminants. Horse and human movement creates particulate matter suspensions from soil-based surfaces, bedding, and horse feed.[1] Volunteer workers assist in equine assisted activities/therapies delivery. No safe level of air pollution exists.[2] Recommendations to reduce daily exposures must be weighed against benefits of engaging in activities that may increase exposures.

Preliminary Data

	Metals (ppm)		
Footing Type	Mn	Fe	Pb
Sand (n=15)	309	12,388	8
Sand w/Fiber (n=12)	356	1684	4
Rubber Composite (n=2)	50	841	18

Metals vary with footing type (p=0.0172, 0.0002, and 0.0004, respectively by metal) and means are within normal values.

References

[1]Elfman, L., Riihimäki, M., Pringle, J., and R. Wålinder. (2009). Influence of horse stable environment on human airways. Journal of Occupational Medicine and Toxicology (London, England), 2009:4, 10-10. doi:10.1186/1745-6673-4-10.

[2]Good, N., Mölter, A, Ackerson, C. et al…and J. Volckens. The Fort Collins Commuter Study: Impact of route type and transport mode on personal exposure to multiple air pollutants. Journal of Exposure Science and Environmental Epidemiology volume 2016: 26, pages 397–404

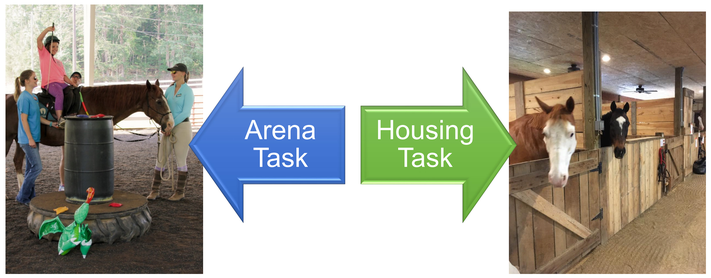
Experimental Design

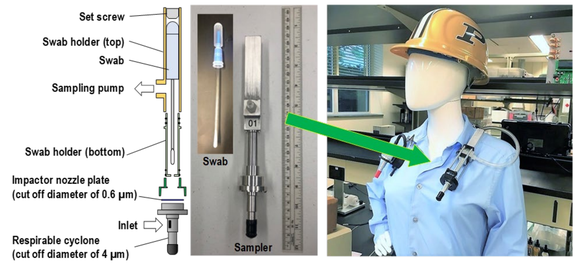
Aim 1: Qualify work practices that impact volunteer workers' exposure to airborne contaminants in EAA/T environments

Collaborate with PATH Intl.	Survey	Choose 3 sites with similar • Work practice • Facility (covered/enclosed) • Footing Type

Aims 2 & 3: Quantify volunteer workers' personal exposure

12 Volunteers per site (n=36)	Arena Task (n=18) Housing Task (n=18)	Devices: SKC 25 mm cyclone Bioaerosol sampler	Gravimetric analysis ICP-MS Total airborne bacteria





Future Directions

Establish links between exposures and biomarkers among EAA/T volunteer workers. Characterize chronic exposures and bioaccumulation of metals. Develop best practice recommendations for therapeutic interventions to ensure health and safety.

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