

Possible lung cancer risk to equestrians exposed



New research on the dangers of Respirable Crystalline Silica among equestrian workers has come to light, writes Dr Alan Hurley of Teagasc

NEW research carried out by the Centre for Climate and Air Pollution Studies, School of Physics and Ryan Institute, NUI Galway, has found that equestrian workers exposed to high levels of Respirable Crystalline Silica (RCS) have a potential increased risk of lung cancer.

Crystalline silica is a natural common mineral, and found in materials such as sand, stone and concrete. Once inhaled, RCS is fine enough to reach deep inside the lung. Significant exposures to this are associated with a range of respiratory diseases, in particular, silicosis, lung cancer and chronic obstructive pulmonary disease.

The aim of the NUI Galway study, carried out in collaboration with the Institute of Occupational Medicine (IOM), Edinburgh, was to evaluate an equestrian worker's personal RCS and respirable dust (RD) exposure. The study was performed on one small to medium-sized Irish equestrian centre, managed and operated by a self-employed worker typical of the sector.

The equestrian centre stabled, on average, 30 horses for training and a further 15 horses for riding lessons. The centre had one indoor arena and two outdoor arenas, all surfaced using silica sand and shredded carpet mix (which is sand mixed with polypropylene, polyester and polyurethane fibres shredded into pieces <30 mm in length). On a few occasions, when no competing work tasks were being performed, the surface of the indoor arena was dampened using a water hose (moved around the arena for approximately one hour).

Personal air measurements collected on the equestrian worker found that RCS concentrations were significantly higher on days when watering on the surface of the indoor arena was not performed. Measured RCS concentrations approached the recommended Irish Occupational Exposure Limit levels for RCS, which could suggest an increased lung cancer risk for this occupational group.

Dr Marie Coggins, principal investigator of the study and Exposure Science lecturer at NUI Galway, stated that "we were surprised to find elevated exposures from an equestrian worker which were approaching the recommended occupational exposure limit. Further exposure studies are required to validate results; however, the present study



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provides a significant way forward in characterising equestrian workers exposure to RCS and RD.”

Protective measures

Studies on equine health have shown that maintaining the optimal moisture content of the footing material can help manage indoor dust concentrations in riding arenas. Keeping the surface of the footing material moist and or using alternative footing materials such as sand with wood chips or wax-coated sand has the potential to reduce worker exposures to RCS. Watering indoor arenas will reduce air concentrations of RCS and RD. Automated watering systems are recommended, as competing work tasks can limit the time that equestrian workers can spend on manual watering regimes.

Choice, maintenance and age of the footing material play a significant role in the generation of particulate concentrations in indoor arenas. Maintaining a clean (manure free) well-mixed moist footing material are some of the control measures recommended to reduce airborne dusts in riding arenas. Regular watering and grooming of the footing materials are recommended to prevent separation and shifting of materials to reduce the release of airborne particles.

Key findings

- Equestrian workers exposed to high levels of RCS have an increased risk of lung cancer.
- Keeping surfaces moist and or using alternative footing materials such as sand with wood chips or wax-coated sand has the potential to reduce worker exposures to RCS.
- There is a lack of awareness among equestrian workers of the risks of RCS exposures and limited use of exposure controls in this sector.
- Equestrian workers need to receive information, instruction and training on the health risks associated with RCS exposure.

Future research

Occupational cancer is the leading cause of work-related deaths in the EU, therefore further research is required to characterise RCS exposures and other potential airborne hazards created as a result of using different footing materials and their additives in equestrian arenas. The study was only the second reported to focus on RCS exposures among equestrian workers. Further research is required to promote aware-

ness within the sector of the exposure risks associated with footing materials used on indoor equestrian arenas and the impact of increased knowledge and understanding of the risks involved.

NOTE: The paper entitled 'Occupational Exposures in an Equestrian Centre to Respirable Dust and Respirable Crystalline Silica' by Dr Coggins and her team has been published in September 2019 in the *International Journal of Environmental Research and Public Health* (<https://doi.org/10.3390/ijerph16173226>).

Occupational Exposure Limit Value (OELV) is the maximum permissible concentration of a chemical agent in the air at the workplace to which workers may be exposed, in relation to an eight-hour or a 15-minute reference period. In practice, exposure levels should be maintained well below the OELV and should always be as low as reasonably achievable, this is particularly important for carcinogens such as RCS.

Further information on OELVs and RCS can be obtained from the Health and Safety Authority.

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