

Work-Related Asthma from Working with Animals

Work-related allergies; conjunctivitis, rhinitis, sinusitis, asthma, dermal allergy, and anaphylaxis are well recognized among workers who care for research animals, e.g., mice and rats.^{1, 2} Depending on the study, 11-44% of workers who work with laboratory animals develop a work-related allergy. The incidence of work-related allergies among individuals exposed to animals at work in other settings is not as well described, e.g., veterinarians becoming allergic to their patients. Also, workers can bring animal antigens home with them, on their clothes and footwear, and their family members can become sensitized.³

From 1988-2026, 41 workers were identified in Michigan's state surveillance system for work-related illnesses with work-related asthma (WRA). Settings where WRA can occur are listed in Table 1.

Table 1. Industries and jobs with animals

- Veterinarians and vet medical workers
- Researchers and workers who care for the animals
- Pet stores and animal breeders
- Farmers
- Workers who enter people's homes where there are pets (e.g., home health care workers)
- Incidental exposures where service animals are present

Of the 41 Michigan workers identified, 12 worked with mice or rats, eight in veterinary medicine, seven in homes where animals were present, six on farms, five in offices and three in pet stores. Thirty-two were new onset asthma and nine were aggravation of preexisting asthma. Examples of occupations of the people diagnosed with WRA were:

- Graduate student completing an experiment on rats for their thesis
- Industrial turkey farmer
- Hospice home health aide in a home with cats
- Nurse working on a unit where there was a service dog

Diagnosis of WRA from animals is made easier by the availability of allergy skin tests and/or specific IgE testing to the dander or urine of many animal species. If a patient has a temporal association of their asthma symptoms with being around animals or animal bedding, documentation of hyperreactivity with either a positive pre/post bronchodilator or methacholine challenge test and a positive allergy skin test or specific IgE allergy testing to the animal(s) they are working around then it is probable that they have work-related asthma. Normally when diagnosing a patient with WRA from exposure to a chemical such as an isocyanate, one wants to document changes in peak flow or spirometry in relationship to work but with WRA due to animals the presence of positive allergy testing to the animal(s) in addition to the work-related symptoms and documentation of hyperreactivity is sufficient to feel confident about the diagnosis of WRA. The exception to not needing breathing tests performed in relationship to work would be: 1) someone has preexisting asthma and their asthma is exacerbated by working around animals, so they will not have a positive allergy testing to the animal species; 2) the patient works with the same species of animal(s) as their pet at home; or 3) the patient has symptom related to working with animals but has negative allergy testing to animals but is reacting to the bedding material (i.e., typically wood chips such

as aspen, ground up corn cobs or cellulose) or to the animal feed. In these three examples breathing tests in relationship to work should be evaluated to confirm WRA.

Engineering controls are the best way to prevent the development WRA from animals. Individually vented cages are the best method to reduce exposure. Figure 1 shows a plastic mouse cage with air intakes and exhaust vents stacked in Figure 2 with ducts exhausting the air from the cages out of the room. This type of setup markedly reduces the exposure to animal antigens that cause allergic symptoms to rodents. Figure 3 shows a ventilation cabinet with a hole where the used bedding is dumped. This exhaust system markedly reduces the air levels of animal antigens that the worker cleaning the cage is exposed to. This combined with wet rather than dry sweeping markedly reduces exposure animal allergens

Figure 1. Individual stackable plastic polycarbonate enclosure for mice/rats with air intake and exhaust vents on opposite ends of the cage.



Figure 2. Plastic enclosures stacked on racks with air intake on outer edge of the rack. Air is pulled through the individual plastic enclosures to middle column and vented through ducts on the ceiling.



Figure 3. Ventilated hood used to dump used bedding before cage is placed in an autoclave for washing.

Once sensitization has occurred, removal from exposure is the best treatment. This is extremely difficult for veterinarians who become allergic to their patients, but some have been able to switch from being a small animal vet (e.g., cats) to being a large animal vet (e.g., cows). Asthma medication and use of respirators around animals will improve symptoms but over many years, patients who can cease exposure will do better; need less medication

and have fewer symptoms. Although there are no randomized controlled trials of the effectiveness of immunotherapy and/or monoclonal IgE antibody treatment for WRA from animals, there are individual case reports.⁴ The following is a report of a veterinarian in Michigan who has been able to continue work with animals because of immunotherapy and monoclonal IgE antibody.

Case Report

A veterinary medical student who had a job as a necropsy assistant for horses, was also around cats, dogs, and rodents. They had four hospitalizations before experiencing a severe asthma attack which required a five-day hospitalization in the ICU. On discharge, the student was prescribed multiple medications. They had cats and dogs at home, which they rehomed after the last hospitalization. They had never smoked cigarettes. They had positive prick skin tests to horses, cats, and dogs. They were able to finish school with restrictions that they not work with animals, living or dead, or enter cage rooms or rooms where animals were handled. An allergist began them on allergy shots to multiple animal species, and they began to regularly receive IgE monoclonal antibody. After graduation with this treatment, they were able to successfully practice veterinary medicine.

Dr. Rosenman remains available to discuss management of individual patients. It is best to email him and then can set a time to discuss, rosenman@msu.edu. Also, we are always interested in receiving new reports of work-related asthma.

References

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