

# AIRBORNE ALLERGEN RESEARCH

**Researchers at AgResearch and BRANZ are examining how allergens move from the floor back into the air.**

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**A**llergens are minute particles that can cause immune reactions in sensitised people. Common airborne allergens include those from house dustmites, cockroaches, cats, rats, dogs, horses, pollen, fungal spores and bacteria. For most people, exposure to allergens goes unnoticed, but in some instances, an individual's reaction can be severe. Asthma is one such reaction, and is estimated to affect 300 million people worldwide, or about 1 in 20. In New Zealand, the prevalence is even higher, affecting around 600,000 New Zealanders, or 1 in 6 people, and accounts for 1 in every 200 deaths.

## Research to investigate allergen movement

Much research has looked at how to minimise people's exposure to allergens indoors. One such study being undertaken by scientists from AgResearch and BRANZ will investigate how allergens move from flooring back into the breathing zone.

Flooring can act as a sink for allergens produced elsewhere and transported into the house. However, little is known about how much of these are disturbed back into the air by everyday household activities such as walking and cleaning. The study will investigate this re-aerosolisation process and will be carried out in a stainless steel, airtight chamber, designed and constructed by AgResearch.

The chamber contains an automated disturbance device, which moves a 35 kg artificial foot up and down along the floor in a repeatable and programmable pattern. Flooring samples will be seeded with a known quantity of household dust collected from vacuum cleaner bags, then subjected to a disturbance regime using the automated



Stainless steel automated aerosolisation chamber.

foot. Laser photometers are attached to the chamber to take real time measurements of the particulate matter released from the

flooring at various heights, including taking measures at babies' crawl height and in the adult breathing zone.

A range of experimental variables will be tested, including comparing hard and soft floor coverings, humidity and level of dust, as well as studies on specific indoor air pollutants, such as mould spores and house dustmite allergens.

This project is part of a larger Foundation for Research, Science and Technology programme, with co-funding from Meat and Wool New Zealand, concerned with building an environmental model to track allergen build-up and dispersion through the home environment. The data collected from the aerosolisation work will be fed into the larger model. By understanding the process of aerosolisation, steps can then be taken to help to minimise exposure, which is likely to be key in reducing the symptoms of asthma.

## How can allergens be removed from the home?

Although the majority of the population will not be affected by allergens, those who are may need to take special precautions to reduce or avoid potential exposure. A number of possible interventions are outlined below. For more information, contact your GP or local asthma society.

### TEXTILE SELECTION, FREEZING AND CLEANING

Use occlusive/barrier covers on bedding. This will help prevent both the build-up and release of allergens and mites.

While freezing has no effect on allergens, it can eliminate house dustmites from textiles. A recent AgResearch study has discovered that some stages of the house dustmite lifecycle are able to survive freezing in domestic fridge freezers for up to 48 hours. It is therefore recommended that textiles be frozen for at least 72 hours, then washed (to remove the stored allergen) and thoroughly dried.

Washing textiles will remove many allergens

efficiently, as most are readily soluble in water. Bedding, including pillows and duvets, should be washed and dried thoroughly at least once every 6–8 weeks.

### VACUUM

Regular and thorough vacuuming of carpets, upholstery, mattresses and pillows will remove large amounts of allergen. Use a vacuum cleaner with a HEPA filter, which should retain 99.9% of particles greater than 0.1 micron. Where possible, those suffering from asthma should avoid doing the vacuuming themselves.

### CHEMICAL TREATMENTS

Several products are available that claim to kill house dustmites and fungi or denature allergens, and it is often difficult for the consumer to judge their effectiveness. It is best to read the label carefully to determine whether the product claims have been scientifically tested. It may also be worth consulting your local asthma society for advice on the effectiveness of such products.

### REDUCE MOISTURE IN THE HOME

Reduce/remove sources of moisture in bedrooms, living rooms and bathrooms. Ensure a high level of ventilation throughout the house by opening windows and using extractor fans in the bathroom and kitchen.

### REMOVE FUNGI/MOULD

If small amounts of visible mould are present in a house, efforts should be made to remove them (using a 10% bleach solution and appropriate face masks and so on). However, if the mould is severe and covers a large surface area, have it removed professionally by mould remediators.

### HEAT THE WHOLE HOUSE

In winter, try to avoid only heating one area of the house, as asthma can be triggered by moving from a warm to a cold room. World Health Organization recommendations are to heat houses to at least 18°C. ■