

## **Indoor Environment & Lung Health**

### What are the benefits of a healthy indoor environment?

It is always better to prevent an illness rather than use medicines to treat symptoms once the illness has developed. This is especially true for asthma, where inflammation of the airways develops. A healthy indoor environment with a low allergen level can prevent allergies and airway inflammation from developing in the first place. This is better than using regular medications to reduce inflammation once it has already developed.

### Who will benefit most?

People with allergies will have milder symptoms and will therefore need fewer medications and have a better quality of life.

Children who are susceptible to developing asthma or allergy will have less allergy and will therefore have less severe asthma than would have otherwise developed.

### What are allergens?

People who become allergic to foreign proteins in the environment are highly likely to develop asthma or other allergic symptoms. Apart from pollens, exposure to these allergens mainly occurs indoors.

Avoidance of these allergens is especially important for two groups of people. Firstly, young children whose parents have had asthma or an allergic condition are likely to benefit from allergen avoidance. They are at high risk of developing symptoms in response to indoor allergens.

This is very likely to occur in the first year of life which is the most critical time for the development of allergy. For babies and young children who are in a high risk group, it is important to avoid as many allergens as possible. People who have become allergic are likely to find that their asthma or other symptoms get worse with continued exposure to the allergen or allergens to which they are allergic.

For those who already have allergic symptoms, it is essential to find out exactly which allergens are causing any health problems before beginning methods to reduce allergen exposure in the home. It is important to remember that many people are exposed to high levels of allergens but suffer no ill effects from them. Health problems only arise if you

develop allergy to a certain allergen and are then continually exposed to that particular allergen.

Your medical practitioner can help you find out what allergens you are sensitive to, by performing some simple skin prick tests. It is a good idea if you are tested to the most common allergens as well as any which you suspect cause your problems.

The tests are simple, inexpensive, and cause only a small amount of discomfort. Small drops of commonly occurring allergens are applied to the forearm and the skin is pricked through the droplet with a small lancet lightly and without actually breaking the skin. A small red bump similar to a mosquito bite and which lasts for about 15-20 minutes will develop if you are allergic to one of the allergens tested. It is important that you haven't been on any anti-allergy drugs prior to these tests.

#### How do we avoid allergen exposure?

Many studies have shown that asthma improves once an allergen source is reduced. In addition, children who are susceptible to developing asthma because it runs in their families are less likely to develop severe asthma if they are not exposed to high allergen levels. When planning allergen avoidance, remember that a combination of methods will be much more effective than any single method used alone.

#### What are housedust mites?

Housedust mites are microscopic creatures and cannot be seen by the naked eye. Mites thrive in any humid place in the home. They are often found in beds, which are damp from both the climate and from perspiration. They are also found in carpets where dampness occurs, and in clothes and soft furnishings. When dust is disturbed by activities such as vacuuming or walking around, the fragmented bodies of dead mites and the faeces of live mites become airborne.

Once these tiny particles are airborne, they can easily spread throughout the house on air currents. They are small enough to be inhaled into the lungs. Houses in warm or humid regions generally have much larger housedust mite colonies than houses in cold or dry climates. This also applies to houses with poor indoor ventilation.

Activities which increase indoor humidity, such as cooking, showering, drying clothes indoors, and evaporative coolers, also lead to larger housedust mite numbers. Conversely, rooms which are well ventilated and dry will have fewer housedust mites.

#### Beds

Most of the problems caused by housedust mites result from colonies of mites which live in beds. Housedust mites are common in beds because the environment is warm and humid and skin scales provide an immediate food source. Mattresses are the most important source of housedust mite allergens. This is because we spend a significant amount of time in bed, and when we are asleep our face is close to the source of the allergen which is then easily inhaled.

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Special mattress covers, called encasings, prevent the mattress allergen from escaping into the bed and into the air. They play an important role in allergen avoidance, especially if the mattress is a few years old.

These covers can be uncomfortable in hot weather but they can be covered with an overlay as long as it is washed regularly. In addition, the linen and top bedding needs to be treated regularly to prevent build-up of allergens even when a mattress cover is used. Hot washing kills mites and removes allergens, but regular cold washing can also help to maintain low allergen levels.

For infants who are susceptible to developing allergy, particular attention needs to be paid to the bed which is where they spend most of their time. A new mattress provides the best protection against housedust mite allergens, especially if all of the linen and top bedding is washed regularly. Sheepskins should be avoided unless they can be hot washed and tumble dried at least fortnightly.

### Floors

The use of chemicals, sprays and steam-cleaning to kill housedust mites in carpets has produced very disappointing results. In general, such methods reduce allergen levels for only a very short time, if at all. Even when these methods reduce allergen levels in the short term, they do nothing to prevent the ongoing proliferation of housedust mites in the long term. Making the carpet damp may even promote the growth of housedust mites colonies.

Floor coverings laid on concrete slabs also accumulate moisture and therefore encourage housedust mite populations to build up. It is probably easier to maintain low housedust mite levels in carpets which have a short pile and a woven backing than in long pile, hard-backed carpets.

Hard floors such as those made from cork, wood or tiles do not harbour mites and can be easily cleaned of dust. Loose mats which can be put out in the sun each month to kill mites can be used. For infants, it is better that they play on a blanket that is washed regularly than play directly on a carpet.

### Furnishings

Fabric-covered furniture, cushions and curtains can harbour large amounts of housedust mite and cat allergens. Impermeable furniture such as leather or vinyl is easier to keep free of allergens, but a reduction in allergen exposure can also be attained if dense, washable covers are used.

### Soft Toys and Clothing

Children's soft toys can become infested with housedust mites. The mites can be killed by placing the toy in the freezer overnight and the allergens can then be removed by washing. Clothing can also harbour high allergen levels, especially after being stored for a long period of time. These can be reduced by regular washing or dry-cleaning.

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### What of damp and mould?

Building faults such as rising damp, leaking roofs and gutters, and poor ventilation, lead to higher levels of housedust mites and moulds in the home. Because of this, people who live in damp homes or homes that have high levels of indoor moulds often report more respiratory symptoms than would be expected. Household items that increase humidity, such as fish tanks or humidifiers, are likely to increase allergen levels.

Are heating and ventilation important?

Methods which keep houses dry are likely to reduce housedust mite and mould levels. Houses which have a relative humidity level below 60% are likely to have very little housedust mite and mould growth. This low level of humidity is impossible to achieve in coastal regions of Australia where the ambient climate is humid.

Nevertheless, indoor humidity can be minimised by using fans vented to the outdoors in the laundry, bathroom and kitchen areas, and by ensuring that the remainder of the house is also well ventilated.

### What of household pets?

Cat allergens are a frequent cause of allergic illness and trigger of asthma symptoms. Dog allergens can also cause problems. These allergens become airborne and are easily inhaled because they are carried on flakes of dry animal skin and dried saliva. Because the flakes are very small, they can remain airborne for hours, and high levels can therefore continue to exist for very long periods after the cat has been removed.

It may take many months before allergic symptoms are improved after a cat has been removed. Homes and schools can have high levels of cat allergens even though no cat is present, presumably because levels build up as a result of being carried in on clothing.

No breeds of cat or dog are low allergen breeds. If it is important to the family to have a pet, exposure to their allergens can be reduced if the pet spends most of its time outdoors. If the cat lives indoors, a combination of air filtration, the absence of carpets, and regular and thorough cleaning of dust-collecting surfaces will help to reduce the amount of airborne cat allergens. Regular washing of the cat will also help to reduce the amount of allergen that the cat continues to produce.

### What of cleaning methods?

Effective cleaning of all dust-collecting surfaces is needed to maintain low allergen levels in the home. It is important to choose methods which remove the dust rather than causing it to become airborne. Dusting with a damp cloth is better than using a dry cloth.

Many vacuum-cleaners are promoted as being effective at removing housedust mites. In reality, vacuuming has little effect on housedust mite numbers because the mites cling to the carpet fabric. However, regular vacuuming can prevent the build-up of large quantities of dust. To avoid increasing airborne allergen levels, it is important to have a cleaner that has doubled walled bags or a filter to prevent the dust escaping back into the air.

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Wearing a face mask or opening the windows whilst vacuuming will help to reduce exposure to dust particles. It is better if people who are allergic ask someone else to both do the vacuuming and empty the vacuum bag.

### What other things affect the places in which we live?

#### *Public Places*

Public places such as transport, cinemas, hotels, schools and child care centres, tend to have much lower allergen levels than homes. The reason for this is not known, but regular cleaning and good ventilation are thought to be important.

#### *Tobacco Smoke*

Children who are exposed to tobacco smoke in their home are more likely to have serious respiratory infections in early life. They can also develop symptoms of wheeze in later childhood than children whose parents do not smoke. It is important that people who smoke do not subject young children to exhaled smoke either in their home or in their car. Limiting smoking to outdoor areas is a sensible option.

#### *Nitrogen Dioxide*

This air pollutant has been shown to cause respiratory problems when it reaches high levels outdoors. It can also occur indoors in high levels if gas is used for cooking or heating. Exposure levels can be greatly reduced by opening the windows, having an extractor fan, and conducting regular maintenance of gas appliances. Only people who already have asthma or other lung disease are likely to be sensitive to the effects of nitrogen dioxide.

#### *Organic Solvents and Formaldehyde*

Organic solvents such as those found in cleaning fluids, paints and other products can evaporate into the air very quickly. For some asthmatics, these can trigger symptoms and make the condition worse in the short term. Avoiding use of products in confined spaces is essential. In addition, new wood-based panels, vinyls and chipboards may give off formaldehyde fumes which can irritate the eyes, nose and throat. The amount of formaldehyde which is released will gradually decrease with time and exposure can be minimised with good ventilation.

### Endorsed Products

Although many products claim to reduce allergen exposure, very few products have been thoroughly tested to measure how much allergen they remove. Even fewer products have been tested to measure whether their use improves allergic symptoms or asthma. Before you buy a product designed to reduce your allergen exposure, check whether any information about stated aims or benefits is available.

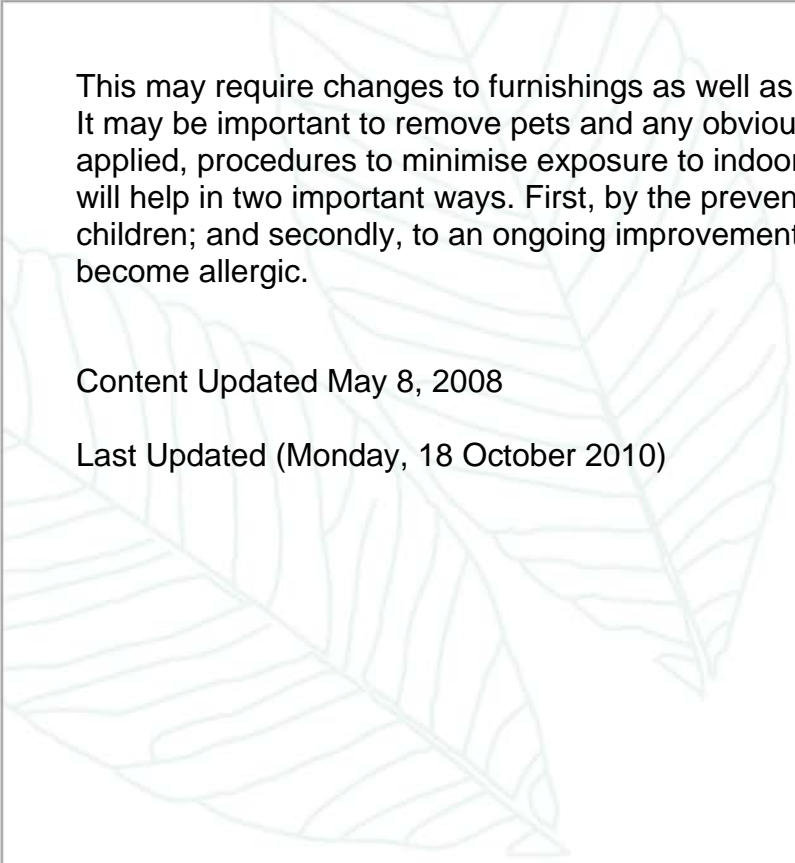
### How should we try to improve our indoor environment?

Good healthy indoor air quality, needs a good background level of ventilation in your home at all times with extractor fans in bathroom, kitchen and laundry areas. In winter, heat your home so that you reduce condensation and maintain adequate ventilation. It is also important to reduce all the places where allergen levels are high.

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This may require changes to furnishings as well as thorough cleaning and laundry routines. It may be important to remove pets and any obvious sources of humidity. If carefully applied, procedures to minimise exposure to indoor allergens and other indoor pollutants will help in two important ways. First, by the prevention of illness developing in young children; and secondly, to an ongoing improvement in symptoms in those who have already become allergic.

Content Updated May 8, 2008

Last Updated (Monday, 18 October 2010)

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