

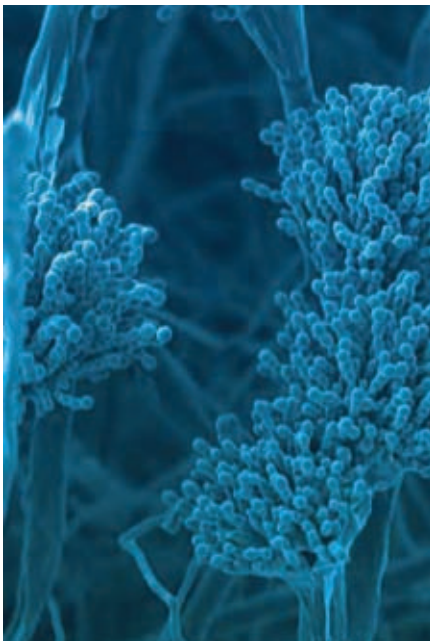


The Air Your Family Breathes At Home

How Healthy Is The Air You Breathe?

“Poor indoor air quality can cause or contribute to the development of or worsen chronic lung diseases such as lung cancer or asthma. In addition, it can cause headaches, dry eyes, nasal congestion, nausea and fatigue. People who already have respiratory diseases are at greater risk for problems caused by poor indoor air quality.”

Australian Lung Association,
June 16, 2004



Aspergillus

Indoor air quality and the health problems created by contaminated air are issues of very significant community health concern. We have all heard about the hazards associated with poor outdoor air. However, insufficient emphasis has been placed on indoor environments. It is now well documented that poor indoor air quality leads directly to a number of health effects on the occupants of affected homes, ranging from minor skin and eye irritations to asthma, allergies, respiratory complaints

and suppression of the immune system. Legionnaires' disease is just one deadly example.

A World Health Organisation report in 1995 estimated that up to one-third of buildings in industrialised countries are so-called “sick buildings”, costing billions of dollars per year in lost productivity and illness. Because Australians spend up to 90% of their time indoors the issue of air quality is one with very real health and economic implications.

The Source Of The Problem

Air conditioning systems are the single greatest contributor to energy consumption in a modern home. To maximise energy efficiency, indoor ventilation systems generally recycle the majority of the indoor air volume, introducing very little ‘fresh’ outside air. As a result, indoor air concentrations of potentially toxic particles can, over time, increase dramatically. Airborne contaminants originate from a variety of sources — including the fumes from solvents and resins used in furniture, carpets and building materials. However, a primary source of indoor air contamination is the bacterial and fungal colonisation of air filters, heat transfer coils and ductwork within the HVAC systems of Australian Homes.

Air Filters

Air passes through filters prior to being cooled and introduced into the indoor environment. However, even higher efficiency air filters are ineffective at removing the smallest airborne particulates which pass

unhindered into the indoor space. Those dust particles trapped by the filter provide a source of nutrients, leading typically to rapid fungal colonisation becoming highly contaminated through the life of the air filter. The fungal colonies produce spores, volatile organic compounds and glucan particles, all of which contribute to elevated levels of harmful airborne contaminants.

Specific microorganisms commonly found within air filters include:

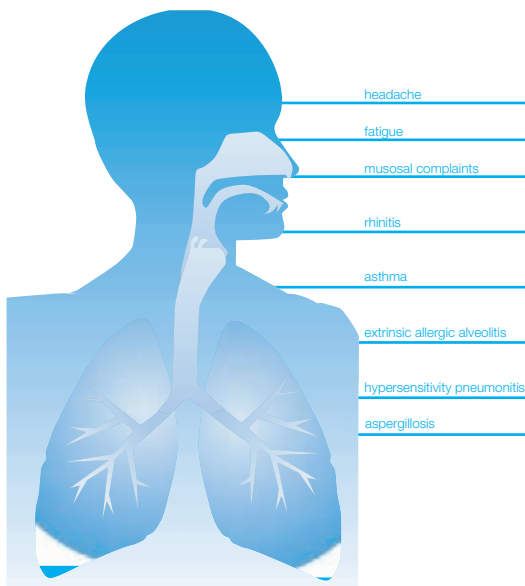
- [Aspergillus](#)
- [Penicillium](#)
- [Alternaria](#)
- [Cladosporium](#)

Exposure to these organisms and to the mycotoxins they produce, can lead to immunological responses, such as airway inflammation, hypersensitivity pneumonitis, asthma attacks, respiratory tract infections (such as aspergillosis) and various allergic and toxic reactions.

The Source Of The Problem

“Children are more susceptible to health effects from air pollutants than the general population... Child related concerns include rising rates of asthma and frequent problems with poor air quality in schools.”

IAQ: Reducing risk in the 21st century, Sacramento Symposium Proceedings, 3-4 May 2000



Cooling Coils

The primary heat exchange components in a modern air handling system are the cooling coils. After passing through the filters, warm air is blown across the surface of the coils, where it is cooled, or “conditioned”. This cooling process draws moisture out of the air resulting typically in the precipitation of large volumes of water onto the coil surface. The air passing across the coils carries with it a range of contaminants including dust, microorganisms and hydrocarbon fumes not removed by the filters. These particulates become entrapped on the wet coil surface. The entrapped microorganisms have a natural predisposition to form biofilms, complex structures that enable extensive bacterial colonies to become entrenched. The damp cooling coil surfaces provide a plentiful supply of both nutrients and water, producing an ideal environment for microorganisms to proliferate within these biofilms.

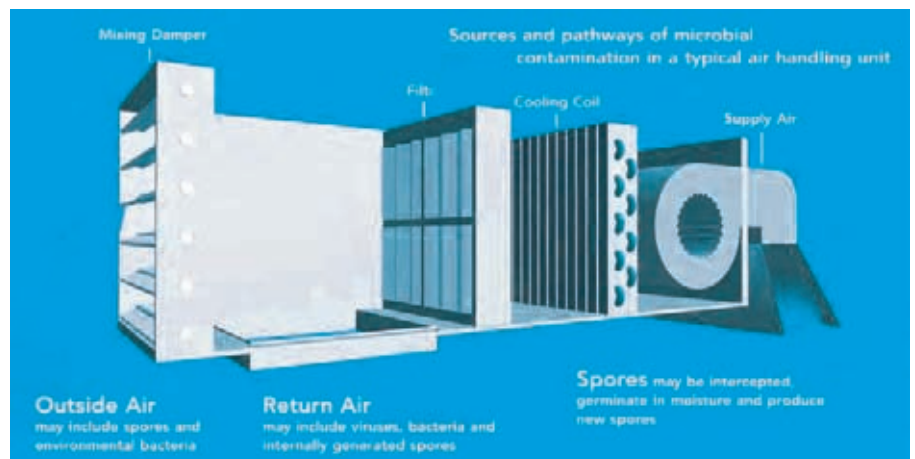
Specific microorganisms common within air conditioning cooling coils include:

- Bacillus
- Pseudomonas
- Flavobacterium
- Candida
- Rhodotorula

Repeated exposure to these organisms can lead to various immunological responses and allergic reactions. In cases where someone’s immune system has been compromised, exposure to these organisms can lead to pneumonia.

Ducts

The ductwork within air conditioned buildings presents by far the greatest surface area for potential microbial colonisation. However, it is the air filters and the heat exchange coils within the air handler units that typically provide the source of bacteria and fungi. Provided these components are appropriately treated significant microbial colonisation of the ductwork is unlikely.



Prevention Rather Than Repair

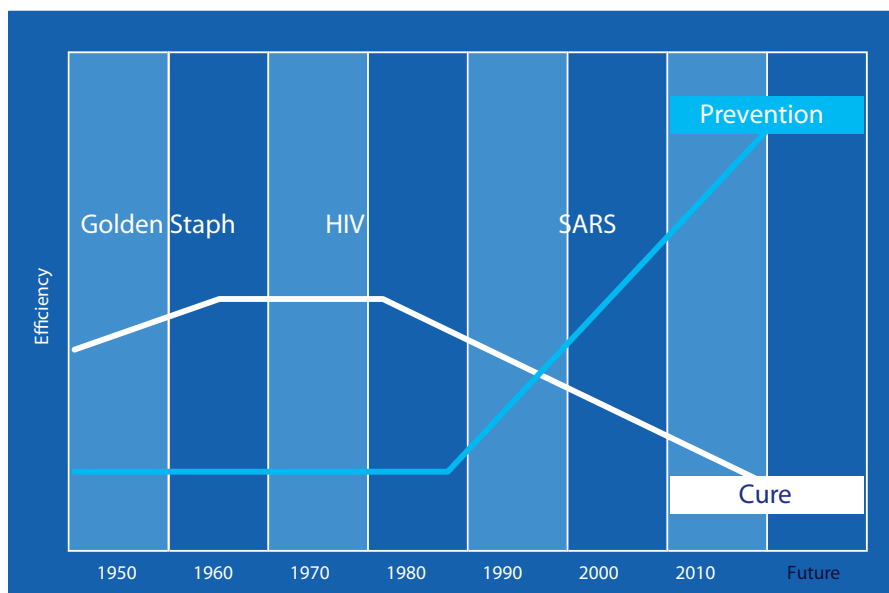
“Indoor air pollution is a much more serious problem than outdoor air pollution. Even when indoor pollution levels are lower than outdoor levels, exposure can be significant because people spend so much of their time indoors.”

Indoor Air Quality and Personal Exposure Briefing Paper, Dr Stanley V. Dawson, California Air Resources Board

A relatively minor amount of visible mould in a home is a serious issue that requires immediate action. Microbial control is most effectively achieved by addressing the problem at its source. Too often the approach to air conditioning maintenance as it relates to indoor air quality is reactionary, with remediation work conducted only in response to known problems.

This type of response is not only expensive but can also effect the health of your family.

The most sensible approach is prevention through proper and regular maintenance of your air conditioner. By doing this you can go a long way to improving the quality of the air your family breathes in at home.



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