

State of Knowledge Report: Air Toxics and Indoor Air Quality in Australia

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6.3 Health effects as a result of exposure to pollutants

The health impacts resulting from exposure to individual chemical substances in building materials are not well understood. Many chemicals present in indoor air environments have not been evaluated thoroughly and little is known about their long-term health effects (Meek 1991). Even less understood are the health effects from constant exposure to mixtures of chemicals (Pollak 1993). Little is known on interactions (antagonistic, synergistic or additive) arising from mixtures of chemicals, even though indoor exposures typically involve multiple contaminants (Ng 1999).

Human health responses to multiple physical and psychological factors in the indoor environment are very individual, complex and often not well defined. There is general knowledge about the qualitative relationship between exposure and health end points, but in quantitative terms information is often very limited (Morawska and Moore 1999). The occupants of buildings with poor indoor air quality can suffer from severe effects (asthma, allergic response, cancer risk) to mild and generally non-specific symptoms. Some health effects may show up years after exposure has occurred or only after long or repeated periods of exposure, and thus can be characterised as long-term health effects. These effects, which include respiratory diseases and cancer, can be severely debilitating or fatal. Long-term health effects are associated with indoor air pollutants such as radon, asbestos, and environmental tobacco smoke.²

The incidence of these health effects has not been investigated systematically in Australia. However, several studies have found that mechanically ventilated office buildings often fail to meet current ventilation guidelines or have occupants who

experience the indoor air to be stuffy and a cause of headache, drowsiness and irritancy (Brown 1997).

Building-related illness (BRI) is a clinically diagnosed illness directly related to indoor exposure (eg lung disease, cancer). 'Sick building syndrome' is a subset of BRI that comprises an excess of chronic symptoms. Raw (1992) summarised sick building syndrome symptoms as:

- irritated, dry or watering eyes (sometimes described as itching, tiredness, smarting, redness, burning, difficulty wearing contact lenses);
- irritated, runny or blocked nose (sometimes described as congestion, nosebleeds, itchy or stuffy nose);
- dry or sore throat (sometimes described as irritation, oropharyngeal symptoms, upper airway irritation, difficulty swallowing);
- dryness, itching or irritation of the skin, occasionally with rash (or specific clinical terms such as erythema, rosacea, urticaria, pruritis, xerodermia); and
- headache, tiredness or lethargy.

Table 7.8 Guidelines for assessing airborne fungi

	Result of air sampling	Acceptable level
A	Confirmed pathogens (eg <i>Aspergillus fumigatus</i>) or toxigenic fungi (eg <i>Strachybotrys atra</i> and toxigenic <i>Penicillium</i> , <i>Fusarium</i> species)	Not acceptable
B	Only one species other than <i>Cladosporium</i> or <i>Alternaria</i>	< 50 CFU/m ³
C	A mixture of species reflective of outdoor flora	< 150 CFU/m ³
D	Primarily <i>Cladosporium</i> or other common phylloplane fungi	< 500 CFU/m ³

8.2.1 Legal issues

No regulations or codes have been developed specifically for indoor air except in workplace environments. Despite this, there are legal obligations regarding indoor air quality on building designers, suppliers of materials and equipment, builders, building owners and tenants (BOMA 1994).

Liability issues associated with indoor air quality have been dealt with under common law and statute law in Australia (Gilbert and Black 2000). Under common law, building occupiers owe a duty of care to persons entering the premises and this may be seen to be breached if reasonable precautions (eg adherence to the Australian Standard for ventilation) are not taken (Immig et al 1997). The duty of care owed is greater to persons at greater risk (eg because of their greater susceptibility to an illness) or if the consequences of injury are greater.

The Department of Health and Aged Care's review of indoor air quality (DHAC 2000) listed a number of Australian legal cases relating to illness from poor indoor air quality. The report also stated that the current indoor air quality policy vacuum might lead to greater legal action, following trends in the United States, creating the danger that policy becomes driven by litigation.

8.2.2 Regulation of indoor air in the workplace

Exposure of building occupants to pollutants in workplace air, whether industrial or nonindustrial, falls within the requirements of occupational health and safety legislation that is set at State level.

State occupational health and safety practices often draw upon guidance and standards developed by the NOHSC. The NOHSC declares national occupational exposure standards for substances. Exposure standards are guides to be used in the control of occupational health hazards. They are designed to assist regulatory agencies, occupational health and safety practitioners, employers, and employees and their representatives, and to secure workplace atmospheres that are as free as practicable from hazardous contaminants. Exposure standards have no legal status until incorporated in Commonwealth, State or Territory legislation. The exposure standards represent airborne concentrations of individual chemical substances that, according to current knowledge, should neither impair the health of nor cause undue discomfort to nearly all workers. They do not define safe and dangerous concentrations of chemicals and are not a measure of relative toxicity. They are not designed to apply to the control of community air pollution.