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New home owners breathe toxic cocktail

Occupants of new Australian homes may be exposed to up to 20 times the maximum allowable limits of indoor air toxics an Australian first study has found.

The CSIRO study shows that the National Health & Medical Research Council's (NHMRC) maximum limits of total volatile organic air toxics may be exceeded in such houses for at least ten weeks after completion.



Steve Brown of CSIRO Thermal & Fluids Engineering says, "This means that up to 500,000 Australians moving into around 120,000 new homes every year could be subjected to high levels airborne toxics for months."

"Air toxics were at their highest at construction showing many materials used in building homes are significant sources of indoor air pollution. The most potent sources are paints, adhesives and some wood-based panels."

Further CSIRO measurements in 27 suburban Melbourne residences more than a year after construction identified 27 airborne toxics. These included the carcinogens benzene, formaldehyde and styrene, and a cocktail of methanol, ethanol, acetone, toluene, dichlorobenzene plus a number of less well-known toxics.

Mr Brown says, "In these established homes, indoor air still carried four times the total volatile organic toxics found in outside air, although the level in all but two of the homes was within the NHMRC guideline of 500 micrograms per cubic metre".

"This guideline was exceeded in all the new buildings studied."

Toxics found in the new and renovated buildings included:

- Styrene; a recognised carcinogen was detected in two homes
- Odour producing toxics, 4-phenylcyclohexene and nonaldehyde; were readily smelt in two of the homes (in one case for years)
- Formaldehyde; irritation levels were found in one of the new homes.

The carcinogen benzene was not present in higher amounts in the new and renovated buildings than in the established dwellings, although its presence was highest in homes with attached garages and in a few other homes where the cause could not be identified.

Of further concern were the formaldehyde levels. The measurements indicate that long-term indoor air pollution is likely from new building materials emitting formaldehyde such as manufactured wood-based panels used principally in flooring, furniture and cabinets.

Formaldehyde is considered a Category 2A carcinogen (probable cancer causing chemical) by the International Agency for Research on Cancer.

"Identifying these air toxics is part of a worldwide focus on identifying and controlling the cost to human health associated with modern living," says Mr Brown.

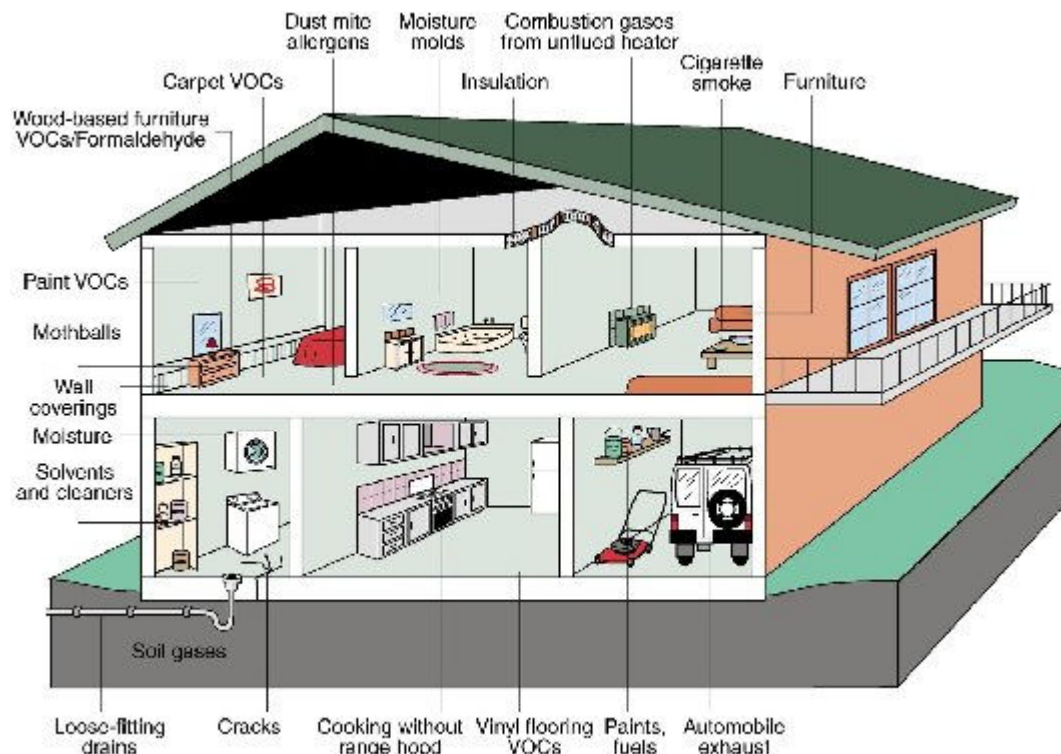
"These measurements are the first of their kind conducted in Australia and are in agreement with findings of similar studies conducted overseas. Together with CSIRO's complementary studies into pollutant emissions from materials and appliances, they allow us to link people's exposures to these pollutants with how we build and furnish our built environments," he says.

This study of indoor air toxics was funded by CSIRO for the benefit of all Australians to assist in developing preventive health strategies for the community.

CSIRO estimates that indoor air pollution costs the Australian community in excess of \$10 billion a year in illness and lost productivity.

There's now an urgent need to move from this assessment phase to implementing control strategies through relevant Government agencies and industry organisations.

Steve Brown, Principal Research Scientist, CSIRO Thermal & Fluids Engineering



Sick Car Syndrome

This syndrome involves many symptoms caused by poor indoor air quality. It has a wide range of symptoms, making assessment very difficult. These symptoms include allergy sensitivity, irritated eyes, nose or throat, tiredness, headaches and poor concentration. These symptoms are generally thought to occur as a result of indoor emission of VOCs and poor ventilation.

This syndrome is caused in vehicles with the following conditions:
New cars fitted with modern materials.
Older cars with damp conditions and mould growth.

Introduction

The cost of indoor air pollution in Australia is estimated by the CSIRO to be as high as \$10 billion a year in ill health and lost productivity. In many cases pollution levels inside cars, homes and commercial buildings has been found to be significantly higher than the pollutant levels in the air we breathe outside.

CSIRO Thermal & Fluids Engineering, as part of its Indoor Air Toxics program, has studied the causes of poor indoor air quality and a range of symptoms that are often referred to as “sick building syndrome” and “sick car syndrome”. They include allergy sensitivity, irritated eyes, nose or throat, tiredness, headaches and poor concentration. These symptoms are generally thought to occur as a result of high indoor emissions of volatile organic compounds, poor ventilation and other biological and chemical toxins and pollutants.

Long-term exposure to poor indoor air quality has been linked to a range of serious health problems ranging from headache, fatigue, eye, nose, throat and skin irritation to serious respiratory illnesses as well as various types of cancers.

In Australia there is increasing pressure from various lobby groups pushing the government to introduce mandatory minimum indoor air quality standards.

There is strong international consensus that the key to controlling indoor air quality is to address the indoor air pollutants at their source. This view is shared by leading Australian scientists like Dr Steve Brown, the head of the CSIRO Indoor Air Environments program, and is backed by regulators and industry overseas.

Exposure to indoor pollutants poses a significant health risk. It has been linked to a range of serious health problems ranging from headache, fatigue, eye, nose, throat and skin irritation to serious respiratory illness and various types of cancers.

Increasingly poor indoor air quality is becoming a public health, environmental and economic issue and a real liability for employers and building managers who fail to provide a ‘safe’ working environment. With the general trend in society towards healthier lifestyles, people are increasingly demanding safer, cleaner and healthier living and working environments.

Research by CSIRO has found high levels of air toxic emissions in new motor vehicles for up to six months and longer after they leave the showroom. Dr Steve Brown, head of CSIRO's Air Quality Control research says, 'Just as air inside our homes and workplaces is often much more polluted than the air outside, so sitting in a new car can expose you to high levels of toxic emissions many times beyond goals established by Australia's National Health & Medical Research Council (NHMRC)'.

CSIRO highlights that there's now an urgent need to implement control strategies, such as the Green Air Label, across all indoor air environments.

The quality of indoor air and its potential effect on human health is an important issue because of the amount of time spent indoors and in one's vehicle. In Australia, figures show the time spent at home and Langley et al. 1992 (in the vehicle ranges from 68% for 15-24 year olds to nearly 90% for those over 65).

Australia currently does not have any single government authority responsible for indoor air quality.

Indoor and vehicle air can be contaminated by the same pollutants as occur outdoors, particularly nitrogen dioxide, particulate matter, carbon monoxide, volatile organic compounds (VOCs) and lead. Indoor air quality can also be affected by pollutants predominantly associated with indoor situations, such as dust mites, formaldehyde, tobacco smoke, asbestos fibres, microbial contaminants, radon and pesticides.