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## THE AIR THAT I BREATHE...

**Mounting scientific evidence points to the indoor environment as a major culprit for the high incidence of asthma cases in the UK. Nick Warburton reports on how home improvements can help relieve the suffering experience by millions**


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Current figures published by the National Asthma Campaign show that one in seven children and one in 25 adults are asthmatic. Until recently, it was assumed that vehicle exhaust fumes were a major cause but scientific evidence has shown that even in the least polluted parts of the UK, such as the Scottish Highlands, the proportion of people with asthma is roughly the same as elsewhere in the country. This means that areas with high pollution levels are unlikely to be responsible for the increase in asthma cases.

Furthermore, considering that almost 80 per cent of our time is spent indoors, the link between indoor pollution and asthma is becoming far more conclusive. It is here that many common triggers can be found, including: house dust mites; moulds, pollen and animal dander; carbon monoxide and nitrogen dioxide from combustion products; household products such as varnishes and paints; tobacco smoke; and pesticides. Individuals can control some of these triggers by making changes to their lifestyle, but in some cases EHOs are best placed to take action.

Ian Ashmore, EHO at Swindon Council and a member of the CIEH's Ad Hoc Asthma Group, has questioned whether the profession is doing enough to protect public health (EHJ, January 1998, page 17). In his article, Mr Ashmore argues that EHOs have little involvement in managing and preventing asthma, even though they are in an ideal position to help sufferers change their living environment. Research has shown, for instance, that a major link between poor housing conditions and asthma exists - dampness, poor ventilation and inadequate heating are all major contributors to poor health. In May 2000, a Nottingham-based charity National Energy Action (NEA), assisted by the Nottingham Health Authority, published a study which found that energy efficient homes with better ventilation can drastically improve the health of asthma sufferers.

The NEA study, set up in 1998, focused on how improved insulation, better heating systems and different types of ventilation could make a significant difference to asthma sufferers. The research was based around seven council houses in Nottingham, in which the homes lacked full modern central heating systems and were occupied by at least one asthmatic. Before any improvements were made to the properties, a research team, led by Rob Howard from the NEA and assisted by Roger Critchley from the Health and Housing Group and Professor Tadj Oreszczyn from University College, London, monitored them for health, comfort, energy use, dust mite population, occupant behaviour and physical conditions. The same tests were repeated a year later to monitor the improvements.

Six of the homes chosen were low-rise traditional constructions with solid or cavity brick walls. The exception was a Tarran bungalow with concrete panel walls. As part of Nottingham City Council's medical priority programme, the council upgraded all of the heating systems in the houses. In the homes where there was only partial heating, full heating was introduced. The houses with no central heating at all were fitted with full heating systems. The heating system consisted of a gas fan-flued boiler, an insulated hot water cylinder with a thermostat, a room programmer, a room thermostat, and one or two thermostatic radiator valves. In addition, loft insulation was increased to a thickness of 200mm and any cavity walls in the homes were insulated.

The rest of the study focused on improving ventilation and during the course of the project three different ventilation strategies were pilot tested. Two homes had "three quarter house" mechanical ventilation and heat recovery systems installed. These systems extracted moist air from the kitchen and bathroom and recovered some of the heat. This heat was then used to warm fresh air from outside which was supplied to all bedroom areas at the first floor. (The systems chosen did not provide fresh air to ground floor living rooms, which is why

they are termed "three quarter house"). The systems also extracted moist air from the top of the staircase to help reduce moisture entering the bedroom areas. The other houses had humidity controlled extractor fans installed in the bathroom and kitchen. Remote relative humidity sensors were also installed, where necessary, to ensure the effectiveness of the fan.

A selection of homes also had individual heat recovery fans installed in bedrooms. These fans extracted stale air, recovering some of the heat and providing a small, but constant, stream of fresh air back into the room. Although the research team experienced difficulties installing the three ventilation systems, overall there were significant health benefits. There was a dramatic reduction in the number of dust mites in all but one of the houses monitored. The occupants also benefited from noticeable health improvements. The study findings showed that the health of all of the occupants had improved by 12 per cent. More importantly, the lung conditions of the four asthmatics tested in the study had improved by an average of 20 per cent and in three cases, the use of medication was reduced.

Commenting on the findings, Amanda Broatch of the National Asthma Campaign pointed out: "Up to 85 per cent of children with asthma are sensitive to dust mites. Good ventilation is likely to benefit people with asthma because it reduces humidity, which in turn reduces the number of house dust mites and moulds."

The study shows that positive health gains can be achieved cost effectively - the total costs of improvements in the study ranged from £700 to £5,500. However, as the study team reveal, energy efficient measures alone are not sufficient. Appropriate ventilation is also essential to maximise health improvements. The group also believes that significant changes to national standards (for ensuring adequate ventilation in existing homes) and a widening of the scope of building regulations are essential. Since 1990, it has been a statutory requirement for new homes to be equipped with extractor fans, but most of Britain's houses are pre-second world war and do not fall under this requirement.

There is clearly much more that can be done, but perhaps a good starting place is for EHOs to acknowledge the problem of house dust mites and their effect on health. According to Mr Critchley: "It is important to make EHOs more aware of the problems of house dust mites and the fact that they thrive in humid conditions. Getting relative humidity levels down to 50 per cent would reduce moulds and house dust mites dramatically." The DETR's proposed guidance on the new Housing Health and Safety Rating System supports the conclusions found in the NEA study - that the presence of house dust mites is a hazard. This is a promising development, and means that EHOs should be able to fulfil their role in protecting public health. Any improvement on the current situation would be a breath of fresh air.

A copy of the report *The Nottingham Energy, Health and Housing Study* is available from First Report, 65 North Road, West Bridgford, Nottingham, NG2 7NG, priced £6. Alternatively send a SAE for a free four page leaflet describing the project and issues in more detail. The National Asthma Campaign website can be accessed at: [www.asthma.org.uk](http://www.asthma.org.uk)

Indoor air specialists may be interested in the WHO Environmental Health pamphlets on air pollution, particularly the title on Asthma, available from the Publications Department, priced £7.60. Tel: 020 7827 5882.