

INFORMATION FOR HEALTH PROFESSIONALS

Asthma and indoor gas appliances

Among the many triggers of asthma, one exposure that is often overlooked is the nitrogen dioxide (NO₂) released by use of gas for cooking and heating. NO₂ is a potent respiratory irritant which can directly cause airway constriction and it can also cause sensitisation to allergens. In population studies it is associated with both the development of asthma and with asthma attacks. For a child with current asthma who lives in a home with a gas stove, 30% of their risk of asthma is from the stove.(1) Australian researchers have estimated that across the community 12% of childhood asthma is attributable to the use of gas cooking stoves.(2)

A study of Australian school children showed that the chance of being allergic to house dust mites was greater in those exposed to more NO₂. The effect was stronger for prior exposure than for current exposure, illustrating the important role of NO₂ as a sensitiser in the development of allergies.(3) This has been confirmed in animal experiments in which mice became allergic to an antigen when simultaneously exposed to NO₂, while the antigen alone did not lead to allergy.(4)

Room heaters are also important. Researchers from the Woolcock Institute of Medical Research did a randomised controlled trial in public schools in the Blue Mountains and Goulburn areas, of replacing Bowin low NO₂ heaters with fully flued versions, and showed a reduction in respiratory symptoms during the weeks when the fully flued heaters were used.(5) In NSW unflued gas heaters are still used in school classrooms, while all other states have removed them. Gas space heaters have the additional risk of carbon monoxide poisoning if they are not operating properly.

Possible responses

1. Improve ventilation: If the kitchen has a range hood ducted outside the house, it should be turned on every time the stove is used. Opening a window or door also helps.
2. If it's an option, replace gas stoves with induction versions. A cheaper alternative is to use a portable induction cooktop which plugs into a power point. These cost about \$100 and can greatly reduce the need to use a gas stove.
3. Remove unflued gas room heaters. Where the heater has a flue, combustion products are removed, unless they are faulty.

Practicalities

Range hoods

Range hoods generally filter the air they collect, then either blow it back into the kitchen or through a duct to outside the house. The filters catch some particles but do nothing about NO₂. For a range hood to be of benefit it has to be ducted to the outside. Many are fairly ineffective.

Home heating

Gas space heaters can be unflued, open flued, or sealed off from the room air. The Climate Council publication *Kicking the Gas Habit* has an illustration of these. Some unflued heaters are designed as Low NO₂, and while these release less NO₂ the problem is not eliminated. It is recommended that gas heaters, including the flue, be serviced every 2 years.

Induction cook tops

Many people find cooking on an induction stove is faster and more flexible than gas, and the stove top is much easier to clean. Not every saucepan works on an induction stove. The cook top needs its own heavy duty circuit and in an old house the meter box may need upgrading. They cost anywhere from \$500 to \$2000.

Costs

When switching from a gas to an induction stove, the energy cost per unit of energy is greater for electricity than for gas, but an induction stove wastes much less energy heating the kitchen. The higher efficiency balances the higher energy price and the cost of cooking is about the same. When switching from gas space heating to reverse cycle air conditioning the efficiency is even better. A reverse cycle air conditioner can deliver 3 to 4 times as much heat as it uses in electricity, so heating costs are likely to be less. Households that end up with no gas appliances and can disconnect from the gas network will save on connection fees of several hundred dollars per year.

Useful Links

- A fact sheet by the National Asthma Council. www.nationalasthma.org.au/living-with-asthma/resources/patients-carers/factsheets/gas-stoves-and-asthma-in-children
- Report by the Climate Council, See the section from page 22 on fossil gas appliances. <https://www.climatecouncil.org.au/resources/gas-habit-how-gas-harming-health/>
- A public Facebook group called My Efficient Electric Home carries stories of people making the change to all electric households. <https://www.facebook.com/groups/996387660405677>
- Carbon Monoxide risks: <https://www.betterhealth.vic.gov.au/health/healthyliving/gas-heating-health-and-safety-issues#gas-heater-safety-alerts>

References

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2. Knibbs L, Woldeyohannes S, Marks G, Cowie C. Damp housing, gas stoves and the burden of childhood asthma in Australia. *MJA*. 2018;208(7):299 - 302.
3. Tu Y, Williams G, Knibbs L. A national cross sectional study of exposure to outdoor nitrogen dioxide and aeroallergen sensitisation in Australian children aged 7-11 years. *Environmental Pollution*. 2021;271.
4. Bevelander M, Mayette J, Poynter M. Nitrogen dioxide promotes allergic sensitisation to inhaled antigen. *The Journal of Immunology*. 2007;179:3680-88.
5. Marks G, Ezz W, Aust N, Toelle B, Smith W. Respiratory Health Effects of Exposure to Low-NO_x Unflued Gas Heaters in the Classroom: A Double-Blind, Cluster-Randomized, Crossover Study. *Environmental Health Perspectives*. 2010;118:1476–82.