

A heated debate – how safe are gas stoves?

UNSW Sydney experts explain why we should be looking for alternatives to cooking with gas.

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Burning methane produces toxic compounds that can have negative impacts on your health. Photo: Shutterstock/goodbishop

The last few years have seen mounting evidence that cooking on a gas stove is bad for our health and sourcing the gas is damaging for the environment.

While the concern over the safety of gas stoves is not exactly new, a recent study re-sparked the debate by estimating that a significant proportion of childhood asthma cases in the US is attributable to exposure to emissions from gas stoves.

The conversation culminated at the beginning of this year when the Consumer Product Safety Commission announced it would consider banning the use of gas stoves in the United States.

But putting US culture wars aside, what does the science say about the impact of cooking with gas?

Associate Professor Donna Green, Chief Investigator of the Digital Grid Futures Institute at UNSW Sydney, says we're right to be worried about the pollution emitted by gas stoves.

"We cook frequently on our stoves. That means you are getting a regular dose of air pollutants quite close to your face, and that's not good. And we now have alternatives that are much safer and better for the environment."

Like Prof. Green, Dr Christine Cowie, an environmental epidemiologist at UNSW Medicine & Health, agrees that we need to move away from using gas. "It's one of many environmental hazards in and near our homes that we need to manage. The science is showing us that we have to move away from burning fossil fuels, full stop – and that includes gas."

Cheap alternatives to cooking with gas, such as induction hobs, are steadily emerging. If possible, a switch to cleaner energy sources is encouraged, but there are precautions you can take to reduce the risk of gas stove emissions causing health problems if you aren't able or ready to make the switch.

What exactly do gas stoves emit and how do the pollutants affect health?

Gas stoves are turned on when gas flows through the supply pipe to the burner, where an electronic ignition system creates a spark to form the blue flame.

"When you're burning gas, you're largely burning methane. And the problem with that is that you create toxic compounds as a result," says A/Prof. Green.

Burning methane, a primary component of gas, creates heat, which can enable nitrogen and oxygen to form nitrogen dioxide (NO₂). "NO₂ is a problem because it can cause a range of very serious health problems, including asthma," says A/Prof. Green.

But it doesn't end there. "When the stove is lit, you're burning a fossil fuel, and in the process, it can also emit carbon monoxide, nitrous oxides and formaldehyde," says Dr Cowie.

Carbon monoxide is another chemical with potentially dangerous repercussions on health. "Carbon monoxide is emitted when gas is burnt and will deplete the oxygen in the

air, and deplete oxygen in the blood too," says Dr Cowie.

Poisoning from elevated levels of carbon monoxide can cause headaches and dizziness. "But people can also become unconscious from carbon monoxide poisoning, and in extreme cases it can lead to death. Such cases have been linked to the use of faulty or inadequately vented gas heaters, more so than gas stoves, although anywhere where that gas is used in an enclosed space can lead to elevated carbon monoxide levels in air," says Dr Cowie.

There have also been studies that have shown gas stoves release other harmful components, including benzene, a cancer-causing agent.

The link between gas stove emissions and asthma

Research from the US suggested that one in eight (12.7 per cent) current childhood asthma cases can be attributed to gas stove emissions.

"We have known there is an association between NO₂ and asthma in that it can exacerbate symptoms in people with respiratory disease such as asthma and chronic obstructive pulmonary disease (COPD)," says Dr Cowie, who was a co-author of a 2019 health impact assessment study which estimated the burden of asthma in children associated with gas stove emissions in Australia.

The research from Dr Cowie and team found similar results to the recently published US study – that 12.3% of the total asthma burden in children is estimated to be associated with gas stove use.

"In particular, exposure to nitrogen dioxide in ambient air has been linked to an increased risk of asthma and other respiratory symptoms, but more recently there is increasing evidence to suggest that NO₂ is likely to be a direct cause of asthma in children," she says.

With an estimated one in 10 Australian children affected by asthma, these latest results are cause for concern.

Burning greenhouse gases

As well as the potential impact on your health, cooking with gas stoves has a huge negative impact on the climate.

"You're burning methane, which is a very potent greenhouse gas, producing carbon dioxide, and that's heating the planet and causing our climate emergency," says A/Prof. Green.

And gas stoves aren't just releasing harmful pollutants when they're being used. "There are lots of chemicals, including methane, that can leak from gas stoves even after you turn them off."

A 2022 study estimated that all the gas stoves in the US emit methane that is comparable in climate impact to the carbon dioxide emissions of approximately 500,000 gas-powered cars.

But there are alternatives that are healthier for the planet, says A/Prof. Green. "We know we need to wean ourselves off gas. And the faster we can start transitioning Australian households off gas for heating and cooking by using heat pumps, induction hobs using green electricity, the better."

What can be done to reduce risk

The main alternative to gas cooking is electrical stoves, which include induction stoves. Induction stoves work by generating heat electromagnetically and are the most energy-efficient method of generating heat for cooking.

Switching from gas to induction can be a costly process if new wiring is needed. But aside from rewiring your stove, it's possible to begin phasing out gas cooking with a widely available \$60 portable induction hob that can be plugged into a normal outlet. "It's exactly as people say, it's very easy to get started," says A/Prof. Green. "It's very fast. It's quiet, it's efficient. But it takes a mental shift to do something differently."

In the long term, it is advised to switch out cooking with gas to cooking with electricity, preferably sourced from renewable power, but that's simply not feasible for everyone. In the meantime, there are precautions you can take to reduce potential health risks.

"To reduce the impact on your health from cooking with gas, you want to get as much ventilation as possible, so open windows and doors – cross-ventilation is the best because it just clears the air out," says A/Prof. Green.

Equally, turning on the extractor fan above the gas stove can greatly reduce the impact. Dr Cowie and team's work found that the burden of asthma associated with gas stoves could be reduced from 12.3 per cent to 3.4 per cent if all homes with gas stoves used high efficiency range hoods that vented emissions outdoors.

"We try and look at solutions and alternatives to the status quo because policies often move very slowly," says Dr Cowie. "As well as raising awareness with consumers, I think the big industries, such as the gas industry, but also the building and appliance industries, have an important part to play. For instance, the building industry can move away from the use of gas in new home-builds and lead by example."