

Higher levels of PM created inside the home from cooking than from modern wood burning stoves

A literature review looking at studies into the contribution from wood burning stoves to indoor particulate matter (PM) in the developed world, has found no scientific evidence for adverse health effects.

Among the key findings of the *Literature review: report on indoor air quality associated with woodburning* by Dr Amanda Lea-Langton, senior lecturer in Bioenergy Engineering at the University of Manchester, were:

- No scientific evidence found for adverse health impacts from exposure to the indoor air typically associated with modern, enclosed wood burning stoves
- No association shown between exposure to indoor wood burning and risk of asthma in developed countries
- Use of modern wood burning stoves may **help to improve** air quality inside the home due to the natural draught created during wood stove operation that pulls air from the room into the appliance and from outside
- Other sources of particulate matter in the home, such as cooking, can release much higher levels of PM compared to modern, enclosed wood burning stoves, and could therefore have greater health risk potential
- In one study, oil-based cooking, such as frying food or grilling meat, had peak value PM concentrations **significantly higher** than the WHO recommended average 24hr exposure limit
- In the same study the Ecodesign wood burning stove indoor air quality averages during operation were **below** the WHO recommended limits.

The review, which has been commissioned by the Stove Industry Alliance (SIA), looked at evidence from over 35 different studies into the impact on indoor air quality in the developed world from solid fuel combustion, including the 2020 study by Chakraborty et al, *Indoor Air Pollution from Residential Stoves: Examining the Flooding of Particulate Matter into Homes during Real-World Use*.

Commenting on the review, James Verlaque, technical manager of the SIA, noted:

“It is vital that we fully understand the impact that the quality of the air inside our homes can have on our health. There has been a common misconception that the use of wood burning stoves is detrimental to our health by their contribution to indoor air quality. The findings of this review do not support this assertion and highlight some important areas for further research. One broad literature review by a public body indicated that there was no association shown between exposure to indoor woodburning and the risk of asthma in developed countries.”

“The Review rightly points out that modern stoves should not be compared with less sophisticated solid fuel combustion practices common in the developing world. Furthermore, there exist studies which present data that indicates cooking and transport are greater contributors to human exposure to PM.”

A Manchester University study conducted in 2021 found that candles, incense, and hairspray all gave higher PM10 and PM2.5 readings than the use of a modern Ecodesign stove. Most staggering however was the indoor air quality impact of cooking a fried breakfast, which gave PM readings over 20 times higher than the WHO recommended limit.

Indoor PM exposure for wood burning stove users was seen to peak during refuelling and during ash removal, a common finding across several studies. However, this is something that can be easily mitigated through better awareness among stove users. Andy Hill, chair of the SIA, advises:

“When refuelling a wood burning stove it is important to follow the manufacturer’s instructions. Refuel when the fire-bed has become glowing embers. Never simply swing the door open as this will lead to a rapid change in pressure within the appliance and may trigger some small escape of fumes (what was described as “flooding” in the 2021 Chakraborty study). Instead, by releasing the door catch and opening the door very slightly the air pressure will settle within a few seconds, then the door can be opened fully and more logs added. Similarly, with a little care any dust escape can be minimised during ash removal.”

Andy concluded:

“This review is an important step forward in better understanding how a range of everyday activities can influence the quality of the air inside our homes. Crucially, it highlights that there is no scientific evidence linking adverse health impacts from exposure to PMs in indoor air and the use of modern wood burning stoves. The review also makes some important recommendations for test protocols and measurement methodology to help further our understanding in this area and the SIA will be working with its members and the wider industry to explore these further.”

[The full report can be downloaded here.](#)

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Editor’s Notes:

- The Stove Industry Alliance was formed in 2008 and is a trade association of stove manufacturers, distributors and retailers, wood fuel suppliers, flue and component manufacturers and other interested industry bodies.
- With over 40 manufacturing members and over 60 retail members, the SIA represents the stove industry in discussion with government departments such as Defra and BEIS, Welsh Government, Scottish Government, and the Greater London Authority.
- The SIA represents the UK in CEFACD, the European Committee of Manufacturers of Domestic Heating and Cooking Appliances and engages openly with all stakeholders.
- Please contact Erica Malkin SIA Communications Manager on 07891 097842 or erica@stoveindustryalliance.com for further comment on this press release.
- Further information on the work of the SIA can be found at www.stoveindustryalliance.com