# Indoor wood burning linked to accelerated lung decline and rising pollution in the UK



Burning wood indoors, often seen as a cosy and environmentally friendly heating option, could be causing lung damage akin to that caused by cigarette smoke, according to new research presented at the European Respiratory Society Congress in Amsterdam. The study, led by researchers from University College London, has raised significant concerns about the health impacts of the growing popularity of domestic wood burning in the UK and Europe.

The researchers analysed health data from over 11,000 participants in the English Longitudinal Study of Ageing, combined with property energy performance certificates and census data, focusing on the use of wood-burning stoves and other solid fuel appliances indoors. They found that these appliances were more commonly used in affluent, predominantly white urban neighbourhoods, including areas designated as Smoke Control Zones where such burning is typically restricted. Lung function, assessed over eight years in approximately 1,700 individuals via the forced expiratory volume in one second (FEV1) test, declined more sharply among wood stove users. For instance, adults aged 70 to 79 using solid fuels experienced an average FEV1 reduction of 0.12 litres compared to 0.07 litres among those not exposed, suggesting a pronounced respiratory decline linked to indoor wood burning.

Dr Horsfall, one of the study’s lead investigators, emphasised that domestic wood burning emits harmful air pollutants indoors and outdoors, including carcinogens. Despite this known hazard, emissions from wood burning in the UK have roughly doubled since 2009, coinciding with the surge in wood stove installations. He noted the difficulty of identifying residential areas with high emissions through existing air quality networks and pointed out that users of solid fuels tended to have lower smoking rates, potentially masking the direct impact of wood-burning smoke on lung health. However, by analysing repeated lung function measurements and controlling for socioeconomic and housing factors, the study demonstrated a clear link between solid fuel use and faster respiratory decline. The researchers likened the lung inflammation caused by particulate matter from wood stoves to that caused by cigarette smoke.

The health risks linked to domestic wood burning are underlined by additional research and public health data. The Clean Air Hub confirms that wood burners contribute significantly to PM2.5 pollution in the UK, a type of tiny pollutant deeply penetrating lungs and bloodstream, which is associated with respiratory and cardiovascular diseases. A University of Sheffield study further found that indoor wood stoves can increase harmful particulate matter levels indoors threefold when in use, exacerbating exposure risks for residents.

Moreover, government data and independent analyses reveal a concerning environmental angle: emissions from wood burning have risen notably in recent years, counteracting air quality improvements made on UK roads. Research published by The Guardian highlights a 19% increase in emissions from domestic wood burning over a decade, and another study from the University of Birmingham found that wood burning now contributes more fine particulate pollution (PM2.5) than road traffic in the UK. This reversal in pollution trends has significant implications for public health and environmental policy.

The economic consequences are substantial, too. A 2022 report estimated that the health-related social costs of residential wood burning in the UK reach around £1 billion annually, driven by increased rates of respiratory and cardiovascular illnesses.

Calls for regulatory action and public awareness come from respiratory health advocates and experts. Sarah Sleet, chief executive at Asthma and Lung UK, urged greater government guidance and regulation, highlighting that many choose wood burners for aesthetic reasons without appreciating their damaging health effects. Similarly, Professor Ane Johannessen of the European Respiratory Society stressed that even newer, eco-design wood stoves may not be risk-free, underscoring the need for clearer public health messaging and consideration of wood burner use in clinical assessments of respiratory health.

Looking forward, the research team plans to investigate whether residents in neighbourhoods with a high density of wood-burning stoves, especially in wealthier areas like parts of London, show increased rates of respiratory conditions such as asthma and chronic obstructive pulmonary disease (COPD), as indicated by prescription and hospital admission data.

In summary, while wood-burning stoves remain popular for their warmth and ambiance, mounting evidence suggests they pose significant risks to lung health and contribute to wider air pollution challenges. This calls for a careful reassessment of their role in domestic heating, alongside stronger regulatory frameworks and increased public awareness to mitigate their harmful impact on respiratory health and the environment.

### 📌 Reference Map:

* Paragraph 1 – [[1]](https://www.independent.co.uk/news/health/log-burner-wood-stove-lung-health-b2836578.html), [[4]](https://www.theguardian.com/environment/2022/mar/30/home-wood-burning-in-uk-causes-1bn-of-health-costs-a-year-report-says)
* Paragraph 2 – [[1]](https://www.independent.co.uk/news/health/log-burner-wood-stove-lung-health-b2836578.html), [[5]](https://www.sheffield.ac.uk/news/indoor-wood-stoves-release-harmful-emissions-our-homes-study-finds)
* Paragraph 3 – [[1]](https://www.independent.co.uk/news/health/log-burner-wood-stove-lung-health-b2836578.html), [[6]](https://www.bbc.co.uk/news/articles/cjdne9ke0m1o), [[7]](https://www.theguardian.com/environment/2022/feb/15/wood-burners-emit-more-particle-pollution-than-traffic-uk-data-shows)
* Paragraph 4 – [[2]](https://www.cleanairhub.org.uk/clean-air-information/the-basic-information/wood-burners), [[5]](https://www.sheffield.ac.uk/news/indoor-wood-stoves-release-harmful-emissions-our-homes-study-finds)
* Paragraph 5 – [[3]](https://www.theguardian.com/environment/2024/feb/14/wood-burning-stoves-cancel-out-fall-particulate-pollution-uk-roads), [[6]](https://www.bbc.co.uk/news/articles/cjdne9ke0m1o), [[7]](https://www.theguardian.com/environment/2022/feb/15/wood-burners-emit-more-particle-pollution-than-traffic-uk-data-shows)
* Paragraph 6 – [[4]](https://www.theguardian.com/environment/2022/mar/30/home-wood-burning-in-uk-causes-1bn-of-health-costs-a-year-report-says)
* Paragraph 7 – [[1]](https://www.independent.co.uk/news/health/log-burner-wood-stove-lung-health-b2836578.html)
* Paragraph 8 – [[1]](https://www.independent.co.uk/news/health/log-burner-wood-stove-lung-health-b2836578.html)

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## Bibliography

1. <https://www.independent.co.uk/news/health/log-burner-wood-stove-lung-health-b2836578.html> - Please view link - unable to able to access data
2. <https://www.cleanairhub.org.uk/clean-air-information/the-basic-information/wood-burners> - Wood burners, including stoves and open fires, are a significant source of PM2.5 air pollution in the UK, contributing to respiratory and cardiovascular diseases. Despite their popularity, they emit harmful pollutants that can penetrate deep into the lungs and bloodstream, leading to serious health issues. The Clean Air Hub emphasizes the need for awareness and regulation to mitigate these health risks associated with domestic wood burning.
3. <https://www.theguardian.com/environment/2024/feb/14/wood-burning-stoves-cancel-out-fall-particulate-pollution-uk-roads> - Research indicates that emissions from domestic wood burning, such as wood-burning stoves, have increased by 19% between 2012 and 2022, counteracting efforts to reduce air pollution from road traffic. The growing popularity of solid fuel appliances in homes has contributed to this rise, highlighting the need for effective measures to address the environmental impact of wood-burning stoves.
4. <https://www.theguardian.com/environment/2022/mar/30/home-wood-burning-in-uk-causes-1bn-of-health-costs-a-year-report-says> - A report reveals that home wood burning in the UK results in health-related social costs of approximately £1 billion annually. The study highlights the significant health risks associated with wood-burning stoves, including respiratory and cardiovascular diseases, and calls for stricter regulations and public health guidance to mitigate these impacts.
5. <https://www.sheffield.ac.uk/news/indoor-wood-stoves-release-harmful-emissions-our-homes-study-finds> - A study by the University of Sheffield found that indoor wood-burning stoves significantly increase levels of harmful particulate matter (PM1 and PM2.5) inside homes. Regular use of these stoves can lead to air pollution levels three times higher than when not in use, posing health risks to residents.
6. <https://www.bbc.co.uk/news/articles/cjdne9ke0m1o> - Research from the University of Birmingham indicates that burning wood at home produces more pollution than road traffic. The study shows that a quarter of harmful particles in the air, known as PM2.5s, come from domestic fires, while traffic is responsible for 22%, emphasizing the significant environmental impact of wood-burning stoves.
7. <https://www.theguardian.com/environment/2022/feb/15/wood-burners-emit-more-particle-pollution-than-traffic-uk-data-shows> - Revised government data reveals that wood-burning stoves in homes produce more small particle pollution than all road traffic in the UK. The data shows that PM2.5 emissions from wood burning rose by a third from 2010 to 2020, reaching 13,900 tonnes annually, highlighting the substantial environmental impact of domestic wood burning.