

Study shows pollution levels in some kitchens are higher than city-center hotspots

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Researchers from the University of Sheffield's Faculty of Engineering measured air quality inside and outside three residential buildings with different types of energy use (gas vs. electric cookers). They found that nitrogen dioxide (NO₂) levels in the kitchen of the city-centre flat with a gas cooker were three times higher than the concentrations measured outside the property and well above those recommended in UK Indoor Air Quality Guidance. These findings are published online in *Journal of Indoor and Built Environment*.

"We spend 90 per cent of our time indoors and work hard to make our homes warm, secure and comfortable, but we rarely think about the pollution we might be breathing in," says Professor Vida Sharifi, who led the research. "Energy is just one source of [indoor pollution](#), but it is a significant one. And as we make our homes more airtight to reduce heating costs, we are likely to be exposed to higher levels of indoor pollution, with potential impacts on our health."

The study, funded by the Engineering and Physical Sciences Research Council (EPSRC INTRAWISE Consortium), compared a rural house with two flats, one in Sheffield city centre and the other in an urban location next to a busy road. The rural house had an electric cooker while both flats used gas appliances. Samples were taken outside and inside the properties, from each kitchen, over a four-week period.

The researchers, Professor Sharifi, Professor Jim Swithenbank and Dr Karen Finney, focused on pollutants known to have a detrimental [health](#)

[impact](#), particularly on the elderly and people with respiratory or [cardiovascular problems](#): carbon monoxide (CO), nitrogen dioxide (NO₂), [volatile organic compounds](#) (VOCs) and solid particles small enough to penetrate into the lungs (2.5 microns in size or smaller, known as PM_{2.5}).

The average [particle concentrations](#) measured by the research team in the kitchens of both flats with gas cookers were higher than the levels set by the government as its objective for outdoor [air quality](#) in both London and England (3). There are currently no set guidelines for safe levels of particles in the home.

Professor Sharifi said: "Concerns about air quality tend to focus on what we breathe in outdoors, but as we spend most of our time indoors, we need to understand more about air pollution in our homes. There is very little data on emission rates from different appliances or acceptable standards on indoor pollutants.

"Although ours was just a small study, it highlights the need for more research to determine the impact of changing housing and lifestyles on our [indoor air quality](#)."

Provided by University of Sheffield

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