



Media release

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New research - Indoor air pollution 3.5 times worse than outdoor air pollution and at its peak can be up to 560 times higher

- ***UK homes can become toxic pollution boxes consisting of trapped outdoor air pollution plus indoor air pollution from cooking, candles and log burners***
- ***55% of parents saying their children spend more time indoors when they are not at school/college than they did at that age - potentially exposing them to more air pollution than their parents when they were younger***
- ***The Clean Air Day campaign has launched a raft of online information on how people can protect themselves and their families from air pollution***

A new study using state-of-the-art pollution monitoring equipment, comparing indoor air pollution levels with outdoor air pollution, has been launched ahead of this year's [Clean Air Day](#), which takes place on Thursday 20 June. The science project, commissioned by environment charity Global Action Plan, compared pollution levels over a 24-hour period in four towns and cities across the UK - London, Pontypridd, Liverpool and Lancaster.

The research, undertaken by [National Air Quality Testing Services](#), monitored levels of ultrafine particle pollution both indoors and outdoors. The research identified the following:

- Peaks of this type of indoor air pollution occur as a result of everyday activities, particularly cooking and using a woodburner.
- Our data also shows that outdoor air pollution adds to indoor air pollution, creating a build up of pollution in the home with pollution peaks taking longer than outdoors to disperse. The monitoring also identified that outdoor air pollution spikes created an increase in indoor air pollution.
- Ultrafine particle pollution levels were on average 3.5 times higher inside than outside, peaking at 560 times outdoor air pollution.
- The air pollution monitored consisted of ultrafine particles (UFPs)¹. According to a leading expert, ultrafine particles have the potential to have greater health impacts than PM10 or PM2.5 pollutants because they are smaller and evidence suggests they can be more easily absorbed into the body.

Clean Air Day also commissioned Opinium Research to undertake research into the length of time children are spending indoors.

The research found that, according to parents, children are spending larger proportions of their waking hours indoors than the previous generation. Given that air pollution is worse indoors than outdoors, this will potentially expose them to more air pollution. During the school week children are spending the majority of their waking hours after school at home, indoors - on average six hours a day. This rises to seven hours a day at the weekend.

Clean Air Day's research has been launched ahead of a more in-depth study into the effects of indoor air pollution on children's health, being carried out by the Royal College of Paediatrics and Child Health (RCPCH) in collaboration with the Royal College of Physicians (RCP).

One of the lead authors, Professor Stephen Holgate, a leading health and air pollution expert, said: "This study provides early indicators of the scale of the air pollution challenge that we face in the UK - not only on our streets but in our homes. With children spending increasing hours indoors exposing them to ultrafine particles of pollution, which can enter the bloodstream and

¹ Ultrafine particle report from the Air Quality Expert Group (DEFRA) https://uk-air.defra.gov.uk/assets/documents/reports/cat09/1807261113_180703_UFP_Report_FINAL_for_publication.pdf

could have a greater impact on vital organs, urgent action needs to be taken to address this issue of indoor air pollution.

“Ultrafine particles have the potential to have greater health impacts than PM10 or PM2.5 because they can be more easily absorbed into the body. In addition their minute size means they behave together like a gas, are able to pass through the lungs into the circulation and get taken up into cells where they exert damaging effects.”

Chris Large, Senior Partner at Global Action Plan, says: “This year’s [Clean Air Day 2019](#) we are placing a spotlight on the fact that air pollution isn’t just a problem on our streets, but in our homes too. You can’t just close your door and shut out air pollution. We were shocked to discover that pollution at its peak can be up to 560 times higher indoors than it is outdoors. The combination of indoor and outdoor air pollution sources is turning our homes into toxic boxes, with pollution trapped inside.”

“It’s vital that we raise awareness that air pollution is everywhere, but that there are many things we can do, both indoors and outdoors, to reduce overall pollution and protect ourselves and our families. Some key things you can do to help tackle our pollution crisis are driving less frequently and walking or cycling instead, and opening a window when cooking at home.”

Emma Prior, from Liverpool, is a mother of two teenagers with asthma, and was one of the people who took part in our study. She is concerned at a “growing awareness of things I can’t see that are causing me harm”.

She says: “Outside I’d expect to see quite a high level of pollution - we’re in a leafy street but still quite close to where the M62 comes into Liverpool. But I’m really surprised to see the peaks inside my house. I’ve become aware that we have pollution indoors through such things as the toaster, but I’ve never been too concerned as to do something about it. Now I’m going to look at prioritising ventilation.”

As part of its mission to raise awareness of the effects of air pollution and what people can do about it, Clean Air Day has launched a new set of easy-to-follow guidance on how people can reduce air pollution in the home and outdoors, together with ways to avoid air pollution and better protect their family’s health. Find out more at www.cleanairday.org.uk

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Notes to Editors

Further information and media interviews

Please contact Kate Hinton kateahinton@gmail.com / 07714 708416 or Zoe Sobol zoe@snowballpr.co.uk / 07971 066034

Other materials available

- Case studies of the four householders who participated in the study including quotes including photography.
- Graphs comparing the pollution levels inside the home with outside.

Academic commentary available

Professor Stephen Holgate Professor Stephen Holgate is Medical Research Council Clinical Professor of Immunopharmacology and Honorary Consultant Physician in Medicine at the University of Southampton.

Stephen Holgate's commentary on the role of ultrafine particles: "Ultrafine particles have the potential to have greater health impacts than PM10 or PM2.5 because they can be more easily absorbed into the body. This is because as particles become smaller and smaller until they become 'ultrafine or nanoparticles' their total surface area increases faster than their weight or mass hence the surface area properties of these particles become more important in determining their behaviour when inhaled.

"Examples include their far greater capacity to carry into the body reactive chemicals (like a Trojan Horse) on their surface or they become electrically charged making them stick to cells. In addition their minute size means they behave together like a gas, are able to pass through the lungs into the circulation and get taken up into cells where they exert damaging effects."

Top tips on how to reduce air pollution in the home

1. When cooking, always open a window to ventilate the kitchen, or use the extractor fan.
2. Try not to burn toast and other food, which sends indoor air pollution readings through the roof.

3. A simple thing like keeping a lid on a pan while you're cooking reduces the amount of energy required for the cooking itself and therefore the amount of pollution your stove is giving off.
4. Cooking in large batches is an efficient way to use your cooker as well as reduce pollution, because you'll be using the stove or oven less frequently. Refrigerate or freeze the excess and then reheat when needed.
5. When buying a new hob or oven, consider an electric model, which can produce less air pollution in the home than gas alternatives.
6. If you have a woodburner, only use it when you really need to, and burn dry, well-seasoned wood. If you are considering buying a woodburner, ask yourself if you really need one.

About our new indoor and outdoor air pollution research

The Clean Air Day campaign commissioned [National Air Quality Testing Services \(NAQTS\)](#) to conduct four experiments with four families in different UK locations in April and May 2019. Each study monitored the level of ultrafine air pollution particles (more detail below) over a 24-hour period inside and outside the four families' properties. We then compared the results for the purposes of this story. The homes are located in:

- **Liverpool: family of four with two teenage children**
- **Lancaster: family of five with three children under 11**
- **Pontypridd: elderly couple in their 80s**
- **London: family of four with two children under 10**

About ultrafine particles

NAQTS' equipment measures ultrafine particles (UFP), particles that are smaller than 100 nanometres in diameter (less than 0.1 micrometres). To put this in perspective, they are approximately 1,000 times smaller than the diameter of a strand of hair. UFPs are unregulated in air quality and are currently only regulated from the tailpipes of cars. This in contrast to PM10 (10 micrometres) and PM2.5 (2.5 micrometres) which are regulated in outdoor air quality.

PM10 and PM2.5 are measured by their mass, whereas UFPs are so small they have negligible mass, so you measure them by counting them. Therefore, rather than reporting a micrograms per metre cubed - as we do for PM10 and PM2.5 - we report particles per cubic centimetre.

Opinium research

Opinium surveyed 2002 nationally representative adults between 12 and 15 April 2019; 576 respondents had children below the age of 18. Respondents were asked how long they estimate their children under the age of 18 spend indoors per day, excluding time when they are asleep or at nursery/school/college. Where they had more than had more than one child they were asked to provide an average for all of their children. They were also asked whether their children spend more time indoors or outdoors compared to themselves at their age.

- 55% of parents say their children spend more time indoors when they are not at school/college than they did at their age.
- Children under 18 are spending on average six hours a day indoors on weekdays (not including nursery/school/college or when they are asleep) and seven hours a day on weekends.

About Clean Air Day

[Clean Air Day](#) is the UK's biggest air pollution campaign. It's a chance to find out more about air pollution, share information, and make the air cleaner and healthier for everyone. Clean Air Day, which this year takes place on 20 June, is coordinated by environment charity [Global Action Plan](#) and is supported by more than 200 organisations, including Public Health England, British Heart Foundation, British Cycling, Royal College of Physicians, DEFRA, UNICEF, Asthma UK, Great Ormond Street Hospital and additional NHS trusts and local authorities.