



British Heart
Foundation

ACT ON AIR POLLUTION **SAVE LIVES**



**FIGHT
FOR EVERY
HEARTBEAT**

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Overview

Outdoor air pollution contributes to an estimated 40,000 premature deaths in the UK each year¹. Globally, cardiovascular disease (CVD) accounts for an estimated 80% of all such premature deaths² and considerable economic costs. Premature deaths and diseases attributable to air pollution in the UK result in over £20 billion in economic costs alone each year.³ Road transport is a leading contributor to outdoor air pollution and diesel vehicles in particular create the most harmful emissions as they produce particularly high levels of PM and NO₂.

Pioneering research funded by the British Heart Foundation (BHF) has identified that the millions of people in the UK living with cardiovascular conditions may be at a significant risk of suffering a coronary event and hospitalisation⁴ from exposure to high levels of traffic-related air pollution.

Current issues

PM is harmful to health and there is a particularly strong link between the smallest particles (known as ultrafine particles and PM_{2.5}) and poor cardiovascular health. However, the focus to date has been on the health-harms from NO₂ as current EU and domestic legislation deem the UK, excluding Scotland, to be in breach of NO₂ levels only. This indicates the scale of the problem has been underestimated and more widespread action is needed.

Given the significant number of people living with CVD in the UK and the likelihood of their exposure to air pollution – particularly harmful PM emissions produced by diesel vehicles – it is imperative that all levels of government around the UK work to deliver a reduction in outdoor air pollution and a significant, sustained shift away from diesel vehicles.

AROUND 7 MILLION
people living with heart and circulatory disease in the UK

BHF-funded research first identified the impact of PM_{2.5} from

VEHICLE EXHAUST



on the heart and circulatory system

The devastating impact of PM on cardiovascular health

BHF-funded research first identified that even short-term inhalation of elevated concentrations of PM increases the risk of a heart attack occurring within just 24 hours of exposure. Further BHF-funded research has found that particles in diesel exhausts exacerbate the disease atherosclerosis, which can go on to cause coronary heart disease, stroke and other cardiovascular conditions.⁵

PM – Increasing the scale of the problem

With the exception of Scotland, the UK's current legal limits for PM are much less stringent than those recommended by the World Health Organization (WHO). In fact, while the WHO does provide guidelines on PM limits, it states that no safe minimum level of PM inhalation exists.

According to the WHO database, at least 37 UK towns and cities are in breach of the WHO air quality standards for PM_{2.5}, whilst a minimum of 10 UK towns and cities breach their standards for PM₁₀. This is a significantly higher number than the five cities required to deliver Clean Air Zones by the end of 2019.

Steps must be taken to protect vulnerable groups living in these areas. Particular consideration should be given to the fact that we have an expanding ageing population with a high prevalence of CVD⁶, which may be exacerbated by exposure to PM.

RECOMMENDED ACTION

- 1. Adoption of WHO Guidelines within a Clean Air Act.** The UK Government and devolved administrations should follow the example set by the Scottish Government by adopting the WHO limits into national legislation. This Act should consolidate the complex body of domestic, EU and international air pollution laws into one piece of legislation and seek to ensure the right to access the courts to enforce its provisions around PM and NO₂ emissions.
- 2. The introduction of charging Clean Air Zones in all local authorities identified as in breach of targets, as a means of providing a population level change in road use in the UK's urban centres.** Charging is necessary within Clean Air Zones as it is likely to most effectively discourage diesel motorists from driving their vehicles into high density urban areas. Funds accrued through charging should be reinvested in initiatives that help to further reduce the effects of air pollution.
- 3. The introduction of a targeted diesel scrappage scheme to remove the worst polluting personal diesel vehicles on the streets of the UK and incentivise the uptake of Ultra Low Emissions Vehicles (ULEVs).** Such a scheme should:
 - Seek to incentivise ULEV purchases rather than encouraging a shift back to petrol or to newer diesel engines.
 - Be developed in conjunction with tax incentives to encourage the purchase of less polluting vehicles and investment in adequate infrastructure to support the uptake of ULEVs.
 - Be targeted at those least able to afford a replacement for their vehicle and those with the most polluting vehicles living in the most polluted areas, for both PM_{2.5} and NO₂.
- 4. Promotion of and investment in ULEVs, including improved charging infrastructure and financial incentives to support the transition from combustion engines.** Investment in public charging infrastructure and financial incentives would address the current main deterrents for many people from purchasing ULEVs.
- 5. Tighter Euro Emissions Standards.** Reliable emissions standards which reflect real world driving conditions are essential. To achieve this, better 'conformity factors' – which regulate the extent to which vehicles can produce higher levels of emissions in real-world conditions over laboratory testing - are required. Whilst the BHF welcomes the introduction of a Real Driving Emissions test, we believe that the UK should aim for a conformity factor of 1 rather than 1.5 by January 2020.

“We can't afford to be complacent”

“In the 1950s, when there was a lot of smog, the problem used to be that particles were big and they stuck in the upper airways. Now these nanoparticles go straight past, deep into the lungs, even into the bloodstream. People with heart failure are a vulnerable group and, when the air quality falls, more of them are admitted to hospital. We have a clear link between air pollution levels and heart attacks, and BHF-funded studies have shown that particulate matter in the air is a major cause of this.”

– Professor David Newby, BHF John Wheatley Professor of Cardiology at the BHF Centre of Research Excellence, University of Edinburgh



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 4. Miller, M, Raftis, JB, Langrish, JP, Mclean, SG, Samutrtai, P, Connell, SP, Wilson, S, Vesey, AT, Fokkens, PHB, Boere, AJF, Krystek, P, Campbell, CJ, Hadoko, PWF, Donaldson, K, Cassee, FR, Newby, DE, Duffin, R & Mills, NL (2017), 'Inhaled Nanoparticles Accumulate at Sites of Vascular Disease' *Acs nano*. DOI: 10.1021/acsnano.6b08551
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 6. Peters A et al (2014) 'Long-term exposure to ambient air pollution and incidence of acute coronary events: perspective cohort study and meta-analysis in 11 European cohorts from the ESCAPE project.' *British Medical Journal* <http://www.bmj.com/content/348/bmj.f7412>; Committee on the Medical Effects of Air Pollution, (2010), *The Mortality Effects of Long Term Exposure to Particulate Air Pollution in the United Kingdom*, available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/304641/COMEAP_mortality_effects_of_long_term_exposure.pdf
 7. <https://www.bhf.org.uk/statistics> - BHF CVD Statistics Factsheet UK – page 4



**British Heart
Foundation**

For over 50 years our research has saved lives.

We've broken new ground, revolutionised treatments and transformed care.

But heart and circulatory disease still kills one in four people in the UK.

That's why we need you.

With your support, your time, your donations, our research will beat heart disease for good.

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