

Health, Air Pollution, and the Role of Healthcare Professionals: The Need for Urgent Action

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99% of the global population are breathing air that contains levels of pollutants above the World Health Organisation's (WHO) recommended guidelines¹. The 2022 Lancet Countdown report estimates that exposure to air pollution contributed to 4.7 million deaths globally in 2020, of which 1.3 million (35%) were directly related to fossil fuel combustion. In Ireland, at least 1410 deaths are attributed to dangerous levels of air pollution every year². A recent Irish study has revealed average air pollution levels at all three Dublin maternity hospitals to be in excess of the WHO recommended safe limits³. The European Union (EU) targets for air quality are legally binding: however WHO recommends far stricter limits than the current EU limits of air pollutants, as new evidence shows that even at relatively low levels, air pollution causes serious illness and even death.⁴

Air pollution has numerous negative effects on health. There is well-documented evidence of direct association with respiratory and cardiovascular diseases including lung cancer, COPD, asthma, strokes and myocardial infarctions⁴. Studies show that these health risks are compounded by inequity, with disparities in the burden of air pollution affecting the most disadvantaged households. There is increasing evidence that air pollution affects all areas of the body, as it causes systemic inflammation and oxidative stress affecting across many organ systems. Recent studies have linked fine concentrations of PM_{2.5}, nitrogen dioxide, and other air pollutants to the main causes of blindness: glaucoma, macular degeneration, retinopathy, and cataract⁵. Further research has highlighted the links with dementia and cognitive function⁶, as well as pregnancy-related morbidities including premature birth, reduced birth weight, and an increased risk of pre- and post-partum complications including miscarriage and pre-eclampsia⁴. Recent Irish studies have found associations between stroke admissions⁷, cardiovascular and respiratory admissions⁸, and an

increased incidence of dementia⁶, highlighting the ongoing public health impact of air pollution on this island.

A Healthy Climate Prescription Letter was delivered at COP27 signed by organisations representing 46 million health workers worldwide, to call on governments to end the reliance on fossil fuels for the health of children and future generations. There is also a growing awareness among the public of the need for urgent action on fossil fuel consumption. The recent pandemic and the ongoing war in Ukraine have brought energy supply issues and fuel poverty to the centre of public attention. Irish and European reliance on burning fossil fuels contributes directly to climate pollution. A landmark paper showed significant health benefits in Ireland following the *Smoky Coal Ban*, which resulted in an estimated 116 fewer respiratory deaths and 243 fewer cardiovascular deaths per year in Dublin alone ⁹.

Europe is at a critical juncture regarding energy and climate pollution, as increasing use of fossil fuels would further accelerate global warming, air pollution, political instability and would be detrimental to health and well-being. Despite this, policy responses to date have been slow and insufficient. In Ireland, peat, coal and biomass burning persists in many households. The current energy crisis will likely lead to increased biomass burning and associated indoor air pollution, particularly in disadvantaged areas. There has yet to be any significant effort on a government-level effort to transition Ireland from a transport structure heavily reliant on cars, to a system where active and public transport is prioritised and encouraged, with the current Irish transport system perpetuating traffic congestion in Irish cities and towns, and in turn rising levels of air pollution.

We argue that it is a clinician's duty and responsibility to advocate for action on air pollution, both in clinical practice and at a population level. Clinicians have become accustomed to asking patients about smoking and alcohol consumption, given the widespread understanding on how this directly affects health. Air pollution remains an 'invisible killer'. Screening questions as part of routine history taking offer a simple tool, such as some or all of the questions from Hadley et al. ¹⁰ for example, "*What type of fuel do you use to heat your home?, Do you burn solid fuels inside your home?, Do you spend time near heavy traffic?*", would guide health professionals to assess more closely for the cardiovascular risks of indoor and ambient air pollution. This line of questioning should be incorporated into the medical education on taking a medical social history and the inclusion of further education into the medical curriculum ¹¹. Helpful adjuncts to the patient consultation may also be employed, such as posters in clinics outlining the health risks of air pollution.

Air pollution is perceived by many as an inevitable consequence of industrialisation, globalisation, and modern life. We must not accept this narrative. Air pollution is a public health emergency, and the EUs proposal on the revision of the Ambient Air Quality Directive fails to address the urgency required. Member States, including Ireland, must step up and align with the current WHO guidelines by 2030 at the latest, with clear interim targets and a meaningful actions to ensure they are met. Clinicians and public health professionals need to be advocates for this change, as strongly as we have been previously with smoking.

Doctors can support policymaking by working alongside organisations such as Irish Doctors for the Environment to advocate for cleaner energy, and the provision of financial support for equitable transition for all of society. Direct support for disadvantaged communities who may not have the means to pay upfront for home upgrades or may not own their own home should be prioritised. Important personal and work-based measures include local air quality monitors outside hospitals and GP clinics, promotion of active travel, greening surroundings, to improve air quality, and switching to cleaner energy for clinics and hospitals are key. A solid fuels ban, electrification of heating and transport, expanding the restriction of motorised vehicles and a move towards active transport are also crucial public and planetary health measures. It is every doctor's role to advocate for this at every level.

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