PE2123: Update air quality standards in Scotland to align with 2021 World Health Organisation guidelines

Submission from Asthma + Lung UK Scotland, 30 June 2025

1. What progress has been made in reducing nitrogen dioxide and fine particulate matter in Scotland since 2022/23, when we last sought views on this?

Since the Committee last sought views on progress of reducing nitrogen dioxide (NO2) and fine particulate matter (PM2.5), Asthma + Lung UK Scotland has produced two reports focussing on these emissions and the sources of domestic burning and transport.

In the report Clearing the Air: Transport + Lung Health[1], we analysed Local Authority Annual Reports from 2023 and found that all automatic monitoring stations, with data capture above 50%, recorded levels under the emissions limits for NO2 and PM2.5. However, we compared the levels to the World Health Organisation Air Quality Guidelines 2021 and found that 70.6% of monitoring sites would be under 20 µg/m3 for nitrogen dioxide and 42.7% of the monitoring sites would be within the new guidelines for fine particulate matter of 5 µg/m3.

We have since compared the data from the 2024 Local Authority Annual Reports[2]. There has been progress between 2023 to 2024 for nitrogen dioxide with 79.5% of the automatic monitoring sites meeting the 2021 WHO guidelines. Unfortunately, there has been a reduction to only 10% of monitoring sites would record PM2.5 levels under 5 µg/m3, down from almost half of stations in 2023.

With regards to policy, there has been progress with the full implementation and enforcement of the Low Emissions Zones in Aberdeen, Dundee, Edinburgh and Glasgow. Investment has been made to electrify the rail network and decarbonise the bus network, with grants to bus operators for electric vehicles. The Scottish Government u-turned on its New Build Heat Standard in 2024 and delayed plans for ban the most polluting fuels, such as coal, both policies that could reduce emissions levels from domestic burning and other fossil fuel-based heating systems.

2. To what extent has scientific and public health evidence about air quality evolved since the current standards were adopted? In your answer you could refer, for instance, to impacts on nitrogen dioxide or fine particulate matter on

[1] https://www.asthmaandlung.org.uk/clearing-air-transport-lung-health
[2] https://www.scottishairquality.scot/sites/default/files/publications/2025-05/Scottish_Air_Quality_Database_2024_Annual_Report_Issue2.html

particular groups of people, the effect of Low Emission Zones (or other interventions of a similar nature) on air quality, or any new information or data about the effect of burning particular types of fuel.

There is no safe level of air pollution. Toxic air is a health emergency, causing new lung conditions and worsening existing ones. It can stunt the growth of children's lungs and travel deep into the lungs and brains of unborn babies[3].

The evidence on the damage to public health by air pollution is well-documented. Depending on the source, between 1,800 and 2,700[4] people die prematurely each year in Scotland as a result of toxic air. There is a clear link between air pollution and respiratory disease, lung cancer and cardiovascular disease and there is growing research and evidence linking air pollution to brain health issues, mental health problems, neurological conditions and diabetes. Air pollution has been shown to cause cancers, with research showing that for every 10 µg/m³ of increased exposure to fine particulate matter (PM2.5), the risk of dying from any cancer rose by 22%[5].

Air pollution is the greatest environmental threat to public health The causes of air pollution are complex with numerous sources, but one of the most common culprits in towns and cities is transport emissions. Everyone is exposed to air pollution, short-term or long-term, and at all stages of life, no matter where they live, work and play. It is a cause of ill-health and mortality for people across Scotland, especially for those living with a lung condition such as asthma or chronic obstructive pulmonary disease (COPD).

As an action for Cleaner Air for Scotland 2 (CAFS2), the Scottish Government commissioned a review of the evidence on health impacts of low-level air pollution in countries with levels of ambient air concentrations comparable to Scotland.

A Summary Report[6] on this review was published in October 2023 and referenced 46 studies from countries like Canada, Sweden, Denmark, the Netherlands, and the UK. Some studies identified the levels of exposure and the potential health harms.

- The ELAPSE study[7] (six European nations) "found significant associations between PM2.5, Black Carbon (BC), and NO2 exposure and natural-cause, cardiovascular, respiratory, and lung cancer mortality, as well as stroke, asthma and COPD hospital admissions at concentrations below the European Union limit values for PM2.5 (25 µg/m3) and NO2 (40 µg/m3)".

[3] Impacts of air pollution across the life course – evidence highlight note
[4] https://www.gov.uk/government/publications/chemical-hazards-and-poisons-report-issue-28
[5] https://aacrjournals.org/cebp/article/25/5/839/71066/Cancer-Mortality-Risks-from-Long-term-Exposure-to
[6] https://www.gov.scot/publications/summary-report-review-assessment-evidence-health-impacts-lowlevel-pollution-countries-levels-ambient-air-pollution-comparable-scotland/
[7] https://www.bmj.com/content/374/bmj.n1904

- The MAPLE study (Canada) “found long-term outdoor PM2.5 exposures as low as 2.5 µg/m3 were linked to an increased risk of death in a large representative sample of Canadian adults, with variation across different geographical regions and with smaller effects when adjusted for O3 concentrations.”

As well as the serious impacts on public health, there are economic consequences on individuals, communities and society as a whole. Air pollution is estimated to cost the Scottish economy over £1.1 billion each year in days lost at work and costs to the NHS[8].

As air quality improves and the effects on people with respiratory and other health conditions ease, the financial burden on the NHS and employers will be significantly reduced. However, given the growing evidence associating air pollution with various conditions, the estimated cost to the economy and NHS is likely to rise as research progresses. This is also true for the numbers of estimated early deaths attributable to air pollution.

Air pollution harms us all, but it is more harmful for people living with a lung condition. Pollutants can irritate the airways and exacerbate lung condition symptoms like breathlessness, wheezing and coughing. Triggers, like air pollution, can result in more hospital admissions for people with conditions like asthma and COPD, and there is also some evidence to suggest that air pollution could increase the risk of severe illness from COVID-19. All sources of air pollution can cause new lung conditions with exposure over a long period, and it has been highly associated with the development of lung cancer. For people with lung conditions, air pollution impacts their daily quality of life. Short-term exposure to air pollutants can result in inflammation of the airways, causing coughing and breathlessness, and can also result in life-threatening flare-ups of conditions.

In the Asthma + Lung UK Life with a Lung Condition Survey 2024, 49% of all respondents with a lung condition told us that road transport is the source of air pollution that concerns them most. When it comes to the impact of air pollution on their daily life, people with lung conditions told us that: they have difficulty breathing when air pollution levels are high (43%); they avoid exercise outdoors when air pollution is worse (24%); being exposed to air pollution makes them feel low or depressed (10%); and, they avoid going to places where they know air pollution is higher (34%). [9]

We believe that with better and more accurate air pollution monitoring, reported in an easy-to understand way, we can alert people with lung conditions when pollution is high and drive the behaviour change that we all need to see to reduce our reliance

[8] Extrapolated from a Defra assessment that air pollution costs the UK economy as a whole £16bn per year, based on 29,000 UK- wide deaths from air pollution: Defra, “Impact pathway guidance for valuing changes in air quality” (May 2013)
[9] Source: Asthma + Lung UK Scotland, survey

on cars. The Scottish Air Quality website offers a free alert system, 'Know & Respond Scotland', that communicate alerts by email, SMS text or voicemail around 2pm for the following day. The alerts are graded by 'moderate', 'high' and 'very high', providing health guidance for recipients and action to take if needed. However, the Life with a Lung Condition Survey 2024 found that fewer than 1 in 10 (9%) respondents receive alerts for air pollution levels, so a lot more needs to be done to raise awareness about this system.

Air pollution is more than a public health crisis - it's a social justice issue. People living on lower incomes[10] or living with existing health conditions, children and the elderly are disproportionately impacted by, and exposed to, toxic air11. Those who can't afford to drive are often those most impacted by the toxic air from transport emissions. The poorest communities are more likely to be living near busy roads, in more condensed housing designs and in areas with less green space than more affluent areas. Only a small number of households use wood burning stoves and open fires as their primary source of heat. For the vast majority using such heating methods, it is for aesthetic purposes. Wood burners have become appealing for the more well-off, especially in urban areas. In light of growing gas and electric prices, less affluent households in Scotland are less likely to have the means to retrofit fireplaces or purchase newer and more efficient wood burners. These households are more likely to have greater exposure to poor air quality. We know that it is the most densely populated areas across our towns and cities that have much higher levels of PM2.5. These are also areas where we find the most deprived communities.

Information from the Scottish Transport Statistics 2020 reveals that 19% of households with a net income of less than £10,000 use a car daily, whereas 62% with a household net income over £50,000 use a car daily. There is a similar pattern in car ownership, with 40% of lower earners (less than £10,000 net household income) having one or more car, compared to 97% of households earning over £50,000.12 There is also growing evidence showing that ethnic minority groups are more at risk from air pollution.

A study by researchers at St Andrews University[11] found that ethnic minorities and those born outside of the UK are more affected by higher exposure to air pollution than the rest of the population. The research found that where people lived placed them at a greater risk and found that "people from Indian, Pakistani, Bangladeshi, and Black/African/Caribbean backgrounds tended to report worse health if they were exposed to more air pollution compared to those who were born in the UK."[12] A quantitative study on public perceptions of air quality in Scotland, commissioned by

[10] https://fraserofallander.org/air-pollution-health-and-inequality-in-glasgow/#:~:text=Households%20
[11] https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-023-15853-y
[12] https://news.st-andrews.ac.uk/archive/ethnic-minorities-most-affected-by-long-term-pollution-in-the-uk-study-suggests/

the Scottish Government as part of CAFS 2, found that understanding of air pollution is higher among ethnic minority respondents than white respondents, potentially as a result of ethnic minority groups being more exposed to and harmed by air pollution than white people. Furthermore, households from ethnic minority groups are more likely to have no access to a car, evidencing that they are creating less pollution yet more aware of and exposed to vehicle emissions.

Children and young people are more vulnerable to air pollution than adults, primarily because their lungs and airways are not fully grown, they breathe faster, and they are closer in proximity to vehicle emissions due to their size. There are other reasons why many children are most exposed, with research pointing to in-utero exposure and air pollution levels around maternity units, hospitals, primary schools and nurseries. Exposure to air pollution as a child increases the risk of developing asthma in childhood and later life, as well as chronic obstructive pulmonary disease (COPD) as an adult. If an unborn baby is exposed to high levels of air pollution, this can also lead to premature birth, low birth weight and decreased brain growth in infancy. A study in 2023 from researchers at the University of Edinburgh[13] found that exposure to air pollution at a young age increases the risk of early death. Researchers at the University of Dundee also found that children and young people may be more vulnerable to much lower levels of air pollution than adults, with data showing increased respiratory hospital admissions for under 16's due to nitrous oxides (NO and NO2).

Asthma + Lung UK Scotland's polling of 1,000 adults in Scotland, performed independently by Opinion Matters, reveals that people are more concerned about air quality at schools (66.8%) than in the streets they live (53.5%). However, both results show a majority of people are concerned about air pollution than not.

A single fireplace operating for one hour and burning 10lbs of wood, is estimated to emit 4,300 times more carcinogenic polyaromatic hydrocarbons than 30 cigarettes. [14]

3. The Scottish Government is currently reviewing the CAFS2 strategy with the goal of establishing a long-term policy framework to replace the strategy once it expires. What practical steps can the Scottish Government set out in its new strategy to reduce nitrogen dioxide and fine particulate matter levels?

Asthma + Lung UK Scotland would like the Scottish Government to ensure that all of the commitments in CAFS2 are implemented before the strategy expires in 2026. In its new strategy, Asthma + Lung UK Scotland would like the Scottish Government, partner agencies such as Transport Scotland and SEPA, and local authorities, to:

[13] https://edinburghuni-newsroom.prgloo.com/news/exposure-to-air-pollution-at-young-age-raises-early-death-risk

[14] https://www.familiesforcleanair.org/health/health4/#:~:text=Other%20EPA%20estimates%20suggest

1. Legislate to adopt the 2021 World Health Organisation (WHO) air quality guidelines as legal targets.
2. Increase the automatic monitoring network across Scotland so that every local authority is accounted for, prioritising areas around schools, hospitals, maternity units and care homes.
3. Improve the alert system using greater monitoring so that people with respiratory conditions and other existing health conditions can take action to protect their health during periods of higher air pollution, and GPs, hospitals, schools and care homes are alerted to prepare for exacerbations of people with lung conditions.
4. Accelerate the roll out of electric trains and busses and reduce the proportion of routes using diesel vehicles.
5. Utilise the powers of the Transport (Scotland) Act 2019 to support bus travel in underserved communities and create council-run services that are more affordable and accessible.
6. Offer greater incentives of £5,000 of more to purchase new ultra-low emissions vehicles to encourage the phasing out of petrol and diesel vehicle sales.
7. Audit the electric vehicle charging network annually to find gaps in supply and demand, reporting when and where anomalies are found in charging point data.
8. Implement Low Emission Zones (LEZ) in further cities and large towns in Scotland and expand the LEZ boundaries in Glasgow, Edinburgh, Aberdeen and Dundee by 2030.
9. Implement and enforce the ban on vehicle idling across Scotland and increase the fixed penalty notice to act as a greater deterrent.
10. The Scottish Government, alongside it's public health and environmental agencies, should deliver a national awareness raising campaign to set out clear health advice.
11. A ban on the sale of the most polluting fuels used in domestic burning
12. Deliver a nationwide scrappage scheme for the most inefficient wood burners.
13. Set up PM2.5 monitoring stations in every community.
14. Use data from increased monitoring to communicate health alerts to people living with lung conditions.
15. Revise all legislation covering Smoke Control Areas (SCA's) to better support local authorities to implement and enforce SCA's.

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