

What Impact Would ULEZ Expansion Have on Asthma and COPD Cases?

The Mayor of London does not justify his plan to extend the Ultra Low Emission Zone to outer London by referring to the official Integrated Impact Assessment¹ projections – the Impact Assessment forecasts only very small health benefits – instead, the Mayor relies on rhetoric and anecdotal stories, mainly centred around asthma, and childhood asthma in particular.

So what is known about asthma in London in the context of air pollution, and particularly pollution by nitrogen dioxide, NO₂, the main target of ULEZ?

Asthma Mortality:

The Office of National Statistics, responding to a freedom of information request, gave the following numbers for total child asthma deaths in London²:

Year	Aged under 1	1 to 4	5 to 9	10-14	15-19	Total 0-19
2013	0	0	2	2	0	4
2014	0	1	1	2	0	4
2015	0	0	2	1	1	4
2016	0	1	0	0	1	2
2017	0	0	2	2	2	6
2018	0	1	2	5	3	11
2019	0	0	1	2	0	3
2020	0	0	1	0	0	1

There are multiple known causes and triggers for asthma, so most of this tiny number of cases may not have resulted from air pollution anyway. For instance, hot weather is a recognised aggravating factor, and 2018 had a particularly hot summer, which might account for the higher number that year. While every child's death is an individual tragedy, in the administrative context of a population of over 9 million, these numbers are vanishingly small, and so would be any marginal improvement from ULEZ expansion.

Asthma Hospital Admissions:

A 2022 report from the Imperial College Environmental Research Group³ presents estimates of the number of hospital admissions for asthma. It states that:

“ Exacerbation of asthma by air pollution is estimated to lead to around **700 asthma admissions from 2017 - 2019 in children** in London, **7% of all asthma admissions** in children in London. (Asthma admissions may have more than one cause e.g. air pollution may worsen response to an allergen.)”

This was over 3 years, so the average annual number was **233**. Note that, as stated, this number accounts for just 7% of child asthma admissions. Note also that the headline announcement by City Hall of 3600 child asthma admissions in 2021/22 referred to all-cause admissions, not pollution-exacerbated admissions. (Asthma has many causes and triggers, including indoor pollution, mould, dust mite, household chemicals, outdoor pollution, pollen, cold weather, hot weather, and hereditary factors – see the Appendix). This is an important distinction to bear in mind.

The Imperial College report also gives an estimate of the percentage change in admissions per 10 µg m⁻³ change of pollutant concentration. For nitrogen dioxide, NO₂, and children aged 0-14, this value is 3.9% per 10 µg m⁻³ (p11 of the report).

The likely reduction in NO₂ levels from expansion of ULEZ into outer London is not clear. The Integrated Impact Assessment gives a reduction of 6.9% in emissions, and a 1.4% reduction in NO₂ level when population-weighted. For simplicity and transparency in the arithmetic, we will illustrate the reduction in admissions expected from a 10% decrease in NO₂ levels in outer London, well above those estimates.

Roadside levels⁴ (within 5 metres of a busy main road) of NO₂ in October 2022 were 28 µg m⁻³, and background levels (away from busy traffic) levels were 19 µg m⁻³. Most residents in outer London live well away from busy main roads, so we will adopt an effective value of 22 µg m⁻³.

A 10% notional ULEZ reduction is a reduction of 2.2 µg m⁻³. Since a 10 µg m⁻³ reduction in NO₂ level is estimated to reduce child asthma emissions by 3.9%, the ULEZ reduction in NO₂ level will bring about a proportionate reduction in admissions of $2.2/10 \times 3.9 = 0.86\%$.

0.86% of 233 gives a reduction of just TWO hospital admissions per year across the whole of London.

And note we are talking about hospital admissions, not deaths.

Asthma/COPD Admissions for over-64's

The numbers associated with the 15 – 64 year age group in the report are lower all round and give a much smaller result, so we will not report further on these.

For the over 65 age group asthma was combined with COPD (chronic obstructive pulmonary disease) because it is difficult to clinically distinguish between the two conditions. In this case, the report estimates 900 admissions over the 3 years, or 300 cases per year. For COPD/asthma in the over-64's the percentage change in admissions per 10 µg m⁻³ change of pollutant concentration was estimated at 1.42%. The same NO₂ levels apply as before.

Applying the same process as above, the % reduction in admissions will be $2.2/10 \times 1.42 = 0.31\%$. 0.31% of 300 = 0.94, or rounding up, **ONE less admission per year across the whole of London.**

Comparison with the Integrated Impact Assessment

The Jacobs Integrated Impact Assessment¹ considered the decrease in health burden expected from expanding the ULEZ zone. It did not give estimates for asthma hospital admissions, only “incidences” (undefined). However it did give estimates for Respiratory Hospital Admissions, a term which includes asthma, and in Table 6-2, p73, it estimates that the extended ULEZ scheme would reduce annual London-wide hospital admissions from 2122 to 2086, a decrease of 26 cases or 1.2%.

A decrease of 26 cases across a city of over 9 million people is still a very small number. There are 33 boroughs in Greater London, so that averages out at less than one hospital admission fewer per borough per year. Again, a negligible benefit.

Conclusions

There appears to be no credible evidence that the expansion of the ULEZ into outer London would produce anything more than insignificant health benefits in asthma – or other respiratory diseases for that matter. We identify in this report three separate and credible sources which point to the negligible benefits which might be expected.

Vague statements and political histrionics about suffering children are a misleading way to inform public policy in this area. Proper analysis is required, especially when the policy carries heavy costs for society, as ULEZ certainly does. And these analyses point to ULEZ expansion doing effectively nothing for asthma.

Appendix

The NHS information sheet on asthma⁵ states:

The exact cause of asthma is unknown.

People with asthma have swollen (inflamed) and "sensitive" airways that become narrow and clogged with sticky mucus in response to certain triggers.

Genetics, pollution and modern hygiene standards have been suggested as causes, but there's not currently enough evidence to know if any of these do cause asthma.

Who's at risk

A number of things can increase your chances of getting asthma.

These include:

- having an allergy-related condition, such as eczema, a food allergy or hay fever – these are known as atopic conditions
- having a family history of asthma or atopic conditions
- having had bronchiolitis – a common childhood lung infection
- exposure to tobacco smoke as a child
- your mother smoking during pregnancy
- being born prematurely (before 37 weeks) or with a low birth weight

Some people may also be at risk of developing asthma through their job.

Asthma triggers

Asthma symptoms often occur in response to a trigger.

Common triggers include:

- infections like colds and flu
- allergies – such as to pollen, dust mites, animal fur or feathers
- smoke, fumes and pollution
- medicines – particularly anti-inflammatory painkillers like ibuprofen and aspirin
- emotions, including stress, or laughter
- weather – such as sudden changes in temperature, cold air, wind, thunderstorms, heat and humidity
- mould or damp
- exercise

References

1. Report downloadable at <https://haveyoursay.tfl.gov.uk/15619/widgets/44946/documents/27025>
2. <https://www.ons.gov.uk/aboutus/transparencyandgovernance/freedomofinformationfoi/childhoodasthmainlondon2006to2020>
3. <https://www.imperial.ac.uk/school-public-health/environmental-research-group/research/air-pollution-epidemiology/air-pollution-and-asthma-in-london-2016-2019/>
4. <https://www.london.gov.uk/programmes-strategies/environment-and-climate-change/environment-and-climate-change-publications/inner-london-ultra-low-emission-zone-expansion-one-year-report>
5. <https://www.nhs.uk/conditions/asthma/causes/>