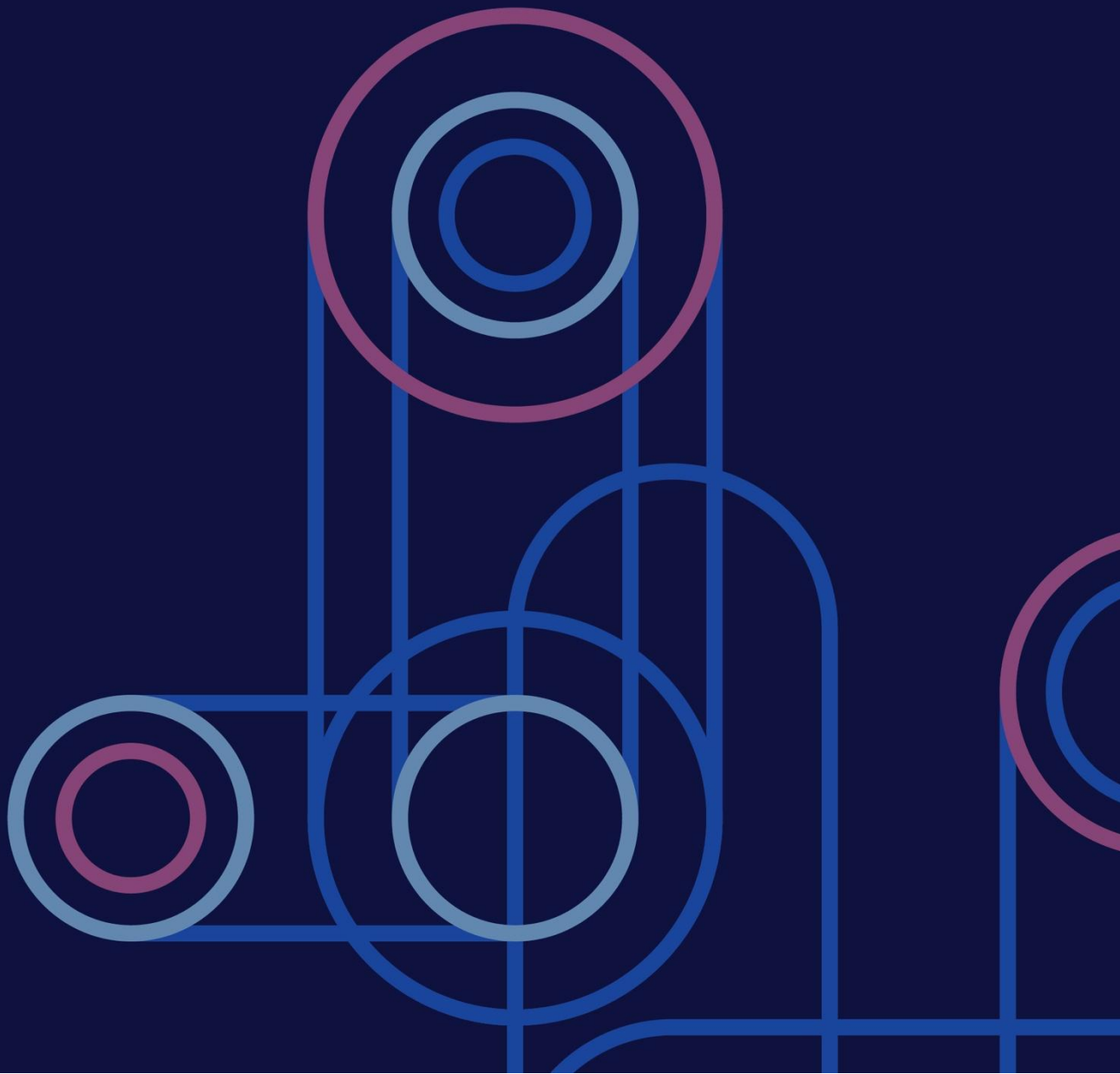
World Health Organization

CASE STUDY

The development of London's Ultra Low Emission Zone

2026

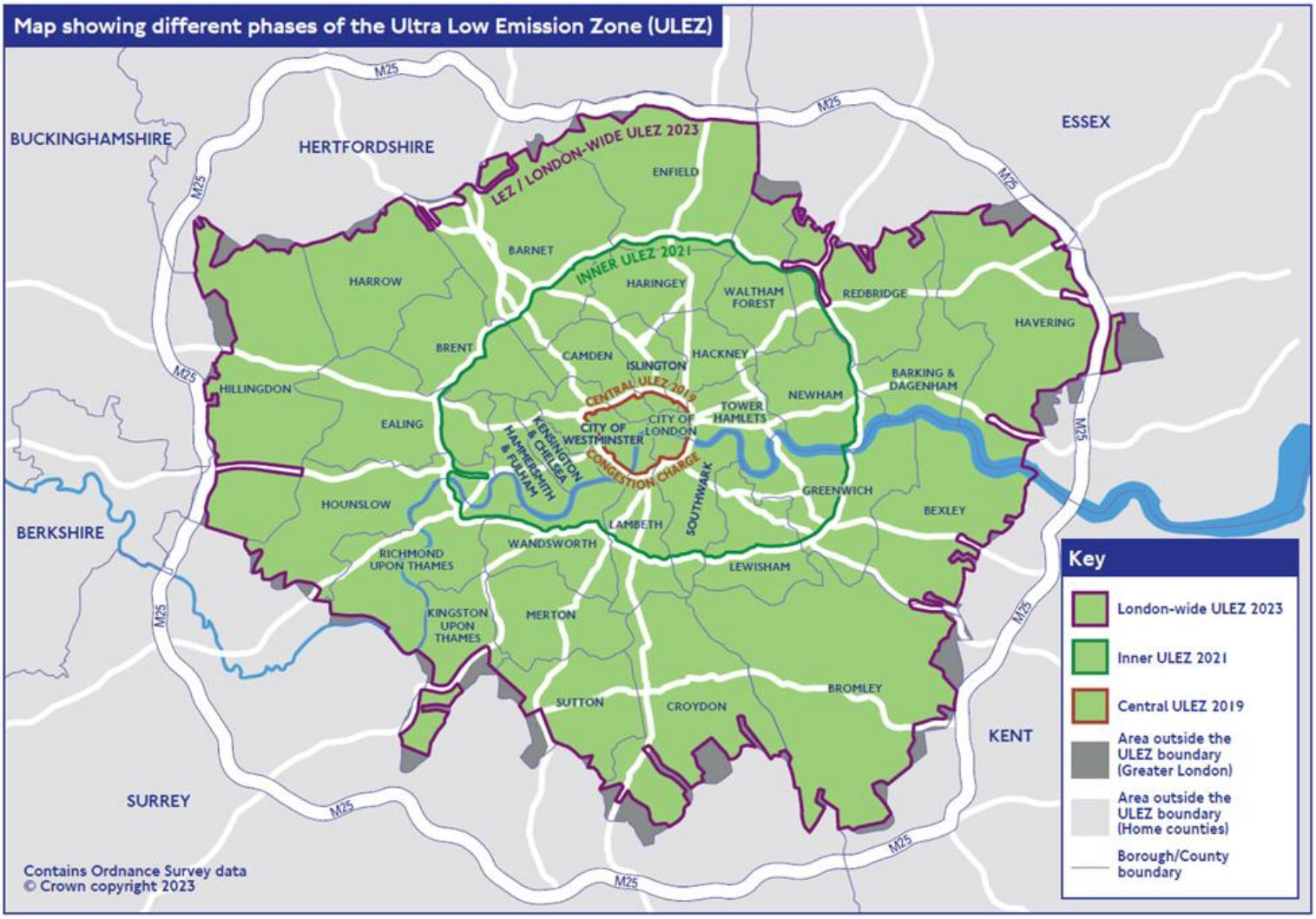


Basic information	
WHO Region	EURO
City or Country	London, United Kingdom of Great Britain and Northern Ireland
Timeline	2016-2024
Type of intervention	Policy; regulation
Primary level of implementation	City
Primary sectors involved	Transport; environment; health
Primary health outcomes or challenges	Air quality; respiratory and cardiovascular risks; health equity

Case description

Londoners have long faced significant health risks from poor air quality, driven primarily by emissions from road transport. In 2016, more than two million residents lived in areas where legal limits for nitrogen dioxide (NO_2) were exceeded, and monitoring sites recorded widespread breaches in both annual and hourly NO_2 thresholds. Evidence compiled by the Greater London Authority (GLA) and the Chief Medical Officer for England underscored the city's high burden of respiratory and cardiovascular disease attributable to air pollution. The impacts were unevenly distributed, with children, older adults and residents of deprived neighbourhoods experiencing higher exposure and greater risk of worse health consequences.

To address these challenges, the Mayor of London and Transport for London (TfL) implemented a series of regulatory measures centred on the Ultra Low Emission Zone (ULEZ), the world's largest clean air zone of its kind. The ULEZ was supported by parallel actions in public transport, active travel and community monitoring. The first phase of the 24-hour ULEZ was launched in central London in 2019, followed by an expansion to inner London in 2021 and a citywide expansion in August 2023. Vehicles operating in the zone are required to meet strict emissions standards or pay a daily charge; this accelerated the transition to cleaner fleets and now over 97% of vehicles seen driving in the zone comply with the standards. The expansion was accompanied by scrappage schemes, public information campaigns, and alignment with borough-level clean air plans.



Map showing different phases of the Ultra Low Emission Zone (ULEZ). London, United Kingdom: 2023. © Pindar Creative.

These measures formed part of a broader strategic approach embedded in the London Environment Strategy and the Mayor's Transport Strategy. Complementary actions included electrification of the bus and taxi fleets, supporting the delivery of rapid charging infrastructure, enhancements to the cycle network, and application of National Institute for Health and Care Excellence (NICE) and Public Health England guidance to inform local actions. The health sector contributed by promoting active travel, reducing fleet emissions, and piloting approaches to consolidate non-emergency patient transport. Air quality audits at schools and nurseries, alongside deployment of hyper-local sensors through the Breathe London network, helped refine exposure assessments and guide local mitigation.

The combined measures introduced across London have led to clear improvements in air quality. Documented average roadside NO_2 levels across London fell by nearly half between 2016 and 2023. Thanks to all phases of the ULEZ, estimates indicate that NO_2 levels were around 27% lower across the whole of London – and more than 50% lower in central London – in 2024 than they would have been without the ULEZ in place. These improvements have delivered measurable health benefits, with the largest benefits accruing where they are most needed – for example, for some of the most deprived

communities near busy major roads, historically facing the highest exposures, there has been an estimated 80% reduction in the number of people exposed to illegal NO_2 levels. For the first time since monitoring began, London's air pollution levels fell to within the legal limits for NO_2 in 2024. A process that air quality experts had estimated would take 193 years without additional action was thus accomplished in just nine years from when the Mayor of London came into office in 2016.

Concerns about equity and financial impacts on residents and businesses posed ongoing challenges for implementation, raising the importance of consistent communication. Borough-level variations in capacity influenced the pace of adoption of complementary measures. However, coordinated governance, clear legal and political mandates, robust data systems and measures to support affected users – such as scrappage schemes – supported the transition. The ULEZ scrappage scheme supported close to 54,000 applicants in the transition to cleaner, greener vehicles, and was entirely funded by the Mayor of London. It remains the largest scheme of its kind in the UK and provided more total funding than all other scrappage schemes outside London supporting Clean Air Zones, or Low Emission Zones combined. Intensive monitoring and transparent, regular reporting of the impact of the ULEZ and associated scrappage schemes further strengthened public accountability.

Future priorities include sustained reductions in $PM_{2.5}$ to achieve WHO guideline levels, through encouraging mode shift to active and sustainable travel and continued electrification of transport fleets, enabled by continued collaboration between the health, environment and transport sectors. London also plans to improve public awareness of the harms of air pollution through community engagement with schools, workplaces and healthcare settings using schemes such as the Breathe London network and the Mayor's Air Quality alert system. The city's long-term aim is to ensure that all Londoners, particularly vulnerable populations, benefit equitably from cleaner air and reduced exposure to health risks.

Strategic Highlight

London's work to tackle air quality challenges illustrates how a single environmental determinant can serve as a powerful entry point for comprehensive action on urban health. Because air pollution arises from multiple interconnected systems – transport, land use, energy, housing and health care – efforts to reduce exposure naturally require coordination across sectors and levels of governance.

Air quality measures can thus mobilise diverse actors around shared objectives. The implementation and subsequent expansions of the ULEZ required alignment between the Mayor of London, TfL, borough councils, health services, community organisations and national bodies responsible for environmental standards. Policy development drew on transport modelling, public health evidence, emissions inventories and monitoring

networks, and required integrated planning systems, regular data exchange and sustained political commitment. As updated WHO guidelines and recommendations from the Chief Medical Officer called for stronger efforts in the face of a growing global evidence base, the air quality agenda provided a unifying rationale for accelerating action across sectors.

Air quality interventions also generate co-benefits beyond pollution control. Measures to reduce vehicle emissions support strategic goals to increase active travel, contribute to climate mitigation and improve neighbourhood liveability. Efforts to clean the bus and taxi fleets advance decarbonisation and noise reduction objectives. Investments in cycling infrastructure and encouragement of modal shift encourages increased physical activity, contributing to prevention of noncommunicable disease. The Breathe London sensor network and school audits strengthened community engagement and local decision-making, illustrating how hyper-local monitoring can support more targeted action by both residents and city authorities.

Focusing on a tangible and measurable issue – in this case, pollutant concentrations and emission sources – can help to demonstrate the impact on equity. London's monitoring and modelling showed that deprived communities face higher exposure and therefore, greater health risks. This evidence informed targeted measures such as scrappage support, prioritisation of schools and nurseries, and borough-level interventions. As a result, improvements in air quality have greatly benefited communities historically exposed to the highest risks.

Finally, air quality is valuable for broader action because it requires cities to adopt a complexity lens. Pollution levels respond to technological, behavioural and regulatory changes across the entire urban system. London's experience shows the value of integrating transport planning, environmental regulations, community engagement and health sector action in an iterative, adaptive process. Such an approach can create momentum for wider urban health strategies, showing how well-designed interventions around one issue can catalyse long-term, system-wide improvements.

Further Information

- New evidence reveals that all Londoners are now breathing cleaner air following the first year of the expanded Ultra Low Emission Zone (ULEZ) | London City Hall
- Air Quality in London 2016-2024
- Chief Medical Officer's Annual Report 2022 – Air Pollution
- Improving air quality and Londoners' health, tackling climate change and reducing congestion (ULEZ consultation)
- Air Pollution in the UK report - DEFRA UK Air - GOV.UK

- London meets legal limits for toxic NO2 pollution for the first time – almost 200 years earlier than predicted – following the Mayor's world leading air pollution policies | London City Hall
- Mayor launches UK's first targeted air quality alert for healthcare professionals
- Review highlights lifelong health impacts of air pollution