

HEALTH AND WELLBEING BOARD: 16 NOVEMBER 2017

REPORT OF DIRECTOR OF PUBLIC HEALTH

AIR QUALITY

Purpose of report

1. The purpose of this report is to update the Health and Wellbeing Board on the estimated impact of poor air quality on the health and wellbeing of people living and working in Leicestershire and the approach the Public Health Department of Leicestershire County Council is taking to tackle this.

Link to the local Health and Care System

2. Poor air quality is the largest environmental risk to public health in the UK. It is known to have more severe effects on vulnerable groups, for example the elderly, children and people already suffering from pre-existing health conditions such as respiratory and cardiovascular conditions. It is therefore of significant interest to the local health and care system and key plans and strategies, including the Joint Health and Wellbeing Strategy and the Sustainability and Transformation Partnership Plan.

Recommendation

3. That the Health and Wellbeing Board notes the significant impact of poor air quality on health and supports the action being taken to tackle this for people living and working in Leicestershire.

Policy Framework and Previous Decisions

4. The UK government and the devolved administrations have policy responsibility for air quality in England, Scotland, Wales and Northern Ireland respectively.
5. Local authorities are required to review and assess local air quality, in accordance with the statutory Local Air Quality Management (LAQM) guidance. Where a local authority identifies areas exceeding statutory limits and there is relevant public exposure, it is required to declare the geographic extent of exceedance as an Air Quality Management Area (AQMA). It must then draw up an action plan detailing remedial measures to address the problem.
6. Local authorities in Great Britain also have powers to tackle local air pollution via the Clean Air Act 1993, the Road Traffic (Vehicle Emissions) (Fixed Penalty) (England) Regulations 2002 and equivalent legislation in Scotland and Wales. The latter includes enforcement powers for stationary idling offences.
7. There are obligations on both the county and district councils within Part IV of the Environment Act in relation to air quality. In summary, although district councils prepare the annual reports and action plans under LAQM, the Secretary of State

expects lower and upper tier councils to work together to develop their content and, with respect to action plans, ensure that all necessary measures to address air pollution in their local area are included.

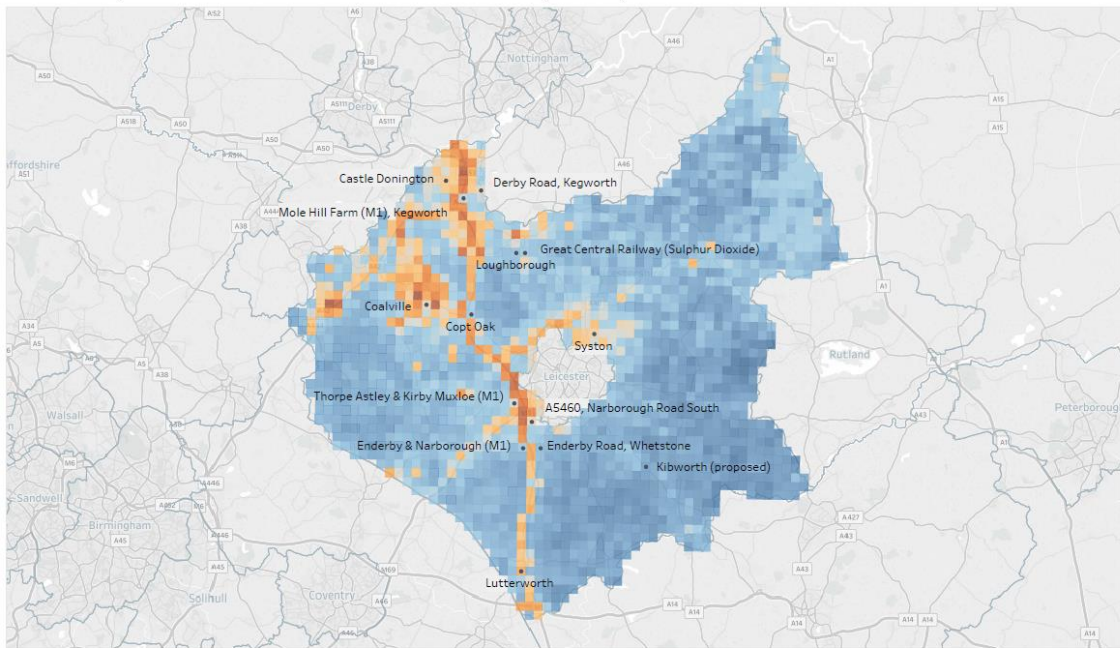
8. In Leicestershire air quality management is the statutory responsibility of district councils. However, as the Local Highway Authority (LHA), the County Council can help district councils identify and develop mitigation methods where pollution is attributable to the local road network and is responsible for the safe and efficient movement of traffic on the road network, which can have a positive impact on air quality delivering traffic / congestion management schemes. Some of the measures the County Council can take to facilitate this include promoting walking, cycling and use of public transport for example by delivering the “Choose How You Move” programme.
9. The Director of Public Health has a statutory duty to ensure that plans are in place to protect the health of the local population.

Background

10. Air pollution damages lives with harmful effects on human health, the economy and the environment. It is the largest environmental risk to the public's health, contributing to cardiovascular disease, lung cancer and respiratory diseases. It increases the chances of hospital admissions, visits to Emergency Departments and respiratory and cardiovascular symptoms which interfere with everyday life. In the most severe cases it increases the risk of death, especially for people who are already vulnerable. Poor air quality affects everyone. It can have long term impacts on all and immediate effects on vulnerable people, with a disproportionate impact on the young and old, the sick and the poor. There is now an extensive body of evidence that long-term exposure to everyday air pollutants over several years contributes to the development of cardiovascular disease (CVD), lung cancer, and respiratory disease. Particulate Matter* (PM) is inhaled into the lungs and ultrafine PM is thought to pass into the blood causing many adverse outcomes, including systemic inflammation. [PM is composed of small specks of matter such as soot, which can be natural but are primarily from traffic - especially diesel engines. PM has three size fractions PM10, PM2.5 and PM0.1. PM10 includes all particles smaller than 10 microns and PM2.5 comprises all particles smaller than 2.5 microns].
11. Long term exposure (over several years) to elevated concentrations of PM2.5 at levels typically experienced in urban areas reduces life expectancy by between several months to a few years. It is likely that air pollution is a major contributory factor on deaths from CVD. It contributes to the development of atherosclerosis (thickening of arterial intima media are apparent after as little as six months' exposure), increased incidence of coronary events, lung cancer and other respiratory diseases.
12. Short-term exposure to PM2.5 episodes over a period of a few hours to weeks can cause respiratory effects such as wheezing, coughing and exacerbations of asthma and chronic bronchitis. It can trigger CVD-related mortality and non-fatal events including myocardial ischemia and myocardial infarctions (MI), acute decompensated MI, arrhythmias and strokes

13. NO₂, particularly at high concentrations over a short time (hours), is a respiratory irritant that can cause inflammation of the airways leading to, for example, coughing, production of mucus and shortness of breath. Studies have shown associations of NO₂ in outdoor air with reduced lung development (lung function growth) and respiratory infections in early childhood and effects on lung function in adulthood.
A number of studies have also reported associations with long-term exposure to NO₂ and adverse effects on health, including reduced life expectancy
14. There is emerging evidence from the Royal College of Physicians (amongst others) of possible links with a range of other adverse health effects including diabetes, cognitive decline and dementia, and effects on the unborn child.
15. Exposure to particulates and nitrogen dioxide is linked to around 40,000 early deaths in the UK each year¹. Public Health England (PHE), in the 2014 publication 'Estimating Local Mortality Burdens Associated with Particulate Air pollution' assess that over 300 deaths in Leicestershire can be attributed to PM_{2.5} pollution. Combined with pollution from Nitrous Oxides, this figure could be around 430 deaths each year². This compares to alcohol related mortality (291 deaths in 2015), and excess winter deaths (approximately 330 per year).
16. Road vehicles are the main pollution source that people are exposed to in the most populated urban environments and the pollutants they cause and emit have the greatest health impacts. Combustion for heating, farming activities and certain industrial processes also contribute to air pollutant emissions, but these tend to be more diluted, contributing to background levels of air pollution. Small changes in distance from the source, street layouts and physical barriers can make a big difference to exposure because air pollution levels can decrease over very short distances depending on the sources and the local situation. There are considerable differences in emissions between different vehicles and fuels. In general, diesel exhausts contain up to 30 times more PM than petrol or LPG/CNG, but all vehicles generate additional PM from friction of brakes and tyres and through re-suspension of dust from road surfaces.
17. There are currently 13 active AQMAs in Leicestershire (See Appendix 1). These largely follow the map below outlining PM_{2.5} levels across the county (cf. DPH Annual Report 2017).
18. There are on-going challenges to meet future housing and employment needs without increasing congestion and reducing air quality.
19. Wholesale solutions may be difficult to attain in the current financial climate. Unless National Government policy / criteria on local road infrastructure funding changes and the profile of air quality is raised, it will continue to be difficult for local government to improve air quality in the face of future growth.

Air Quality in Leicestershire: Particulate Matter (PM2.5)



Please note, each square represents one Ordnance Survey 1km grid square.

Range of PM2.5 values throughout Leicestershire
9.8 ————— 14.6

Source: DEFRA, 2013

Produced by the Strategic Business Intelligence Team, Leicestershire County Council, 2017.

Proposals/Options

20. In line with the recommendations in the Air Quality: A Briefing for Directors of Public Health, Defra, PHE, and LGA. March 2017, work is taking place with partners to improve air quality in Leicestershire:
 1. Understanding Air Pollution in Leicestershire.
Leicestershire is not one of the Local Authorities required by Government to develop 'innovative local plans' that will achieve statutory NO₂ limit values within the shortest possible time. However given the estimated impact on health and wellbeing, and that there is no safe limit identified for air pollution, we are working with district councils to develop a better understanding of air pollution across the county.
 2. Engaging local decision makers about air pollution
This includes:
 - i. developing a strong strategic focus for tackling air pollution, for example by including in the Annual Report of the Director of Public Health
 - ii. championing action for all stakeholders – for example by supporting the development of active travel plans for large organisations, and supporting investment in infrastructure that promotes the use of active travel and electric vehicles; and supporting where appropriate clean air zones
 - iii. Scrutinising strategies and plans that may have an impact on air quality – for example by using Health Impact Assessments for major developments, and using a Health in All Policies approach to influence wider policies and plans

- iv. Recognising air quality co-benefits. In particular the benefits of active travel (walking and cycling) and preservation and development of green spaces.
3. Communicating with the public on the short and long term impacts of air pollution. As well as providing information and mitigating immediate risks, this should be done to help empower local people to take individual action to reduce the production of air pollutants (active travel, good driving habits, using cleaner vehicles etc.)
21. Work is being undertaken with key stakeholders across the County to consider the evidence based and cost-effective interventions recommendation by NICE Guidance: Air pollution: outdoor air quality and health (NG70) 2017. This includes recommendations related to:
1. Planning and Development Management
 2. Clean Air Zones
 3. Reducing emissions from public sector transport services and vehicle fleets (driver training and vehicle procurement)
 4. Smooth driving and speed reduction
 5. Walking and cycling
 6. Awareness raising including for vulnerable groups.
22. Many of the solutions to poor air quality also have enormous co-benefits by increasing levels of physical activity – for example by encouraging active travel. Future housing developments should encourage physical activity by design – making active travel the easiest, quickest and most enjoyable option.

Resource Implications

23. Funding for infrastructure development comes from existing budgets and external funds occasionally issued nationally.

Background papers

NICE Guidance: Air pollution: outdoor air quality and health (NG70) 2017

<https://www.nice.org.uk/guidance/ng70>

Air Quality: A Briefing for Directors of Public Health, Defra, PHE, and LGA. March 2017

<https://laqm.defra.gov.uk/assets/63091defraairqualityguide9web.pdf>

UK plan for tackling roadside nitrogen dioxide concentrations, Defra, July 2017.

<https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017>

Officer to Contact

Rob Howard

Consultant in Public Health

Tel: 0116 3054256

Mob: 07748428689

Email: rob.howard@leics.gov.uk

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Appendix 1. List of Active Air Quality Management Areas in Leicestershire (Correct June 2017)

Appendix 2. Recommendations from n NICE Guidance: Air pollution: outdoor air quality and health (NG70) 2017

Relevant Impact Assessments**Equality and Human Rights Implications**

24. The work being undertaken would have a positive impact on the health of the population.

Partnership Working and associated issues

25. The report focusses on working with agencies across the county to improve the health of the population.

Appendix 1. List of Active Air Quality Management Areas in Leicestershire (Correct June 2017)

AQMA	Description	Date Declared	Date Amended	Pollutants
Blaby District Council				
AQMA 4b	B582 Enderby Road, Whetstone	20/10/2005		Nitrogen dioxide NO ₂
AQMA 1	Narborough Road South and Fosse Park.	19/01/2001	20/10/2005	Nitrogen dioxide NO ₂
AQMA 2	The M1 corridor in Enderby and Narborough.	19/01/2001	20/10/2005	Nitrogen dioxide NO ₂
AQMA 3	The M1 corridor between Thorpe Astley and Kirby Muxloe including the extension areas along the A47 Hinckley Road	19/01/2001	20/10/2005	Nitrogen dioxide NO ₂
Charnwood Borough Council				
Great Central Railway AQMA	An area encompassing a number of properties in the vicinity of the Great Central Railway locomotive engineering shed in Loughborough.	29/11/2004		Sulphur dioxide SO ₂
Loughborough AQMA	Residential properties along the main arterial routes through Loughborough.	20/06/2001	29/11/2004	Nitrogen dioxide NO ₂
Syston AQMA	Residential properties along the main road through Syston	20/06/2001	29/11/2004	Nitrogen dioxide NO ₂
Harborough District Council				
Lutterworth AQMA	The junction of the A427, George Street and Market Street in Lutterworth, including the boundaries of a number of nearby properties.	18/07/2001	04/04/2011 16/04/2013	Nitrogen dioxide NO ₂
Hinckley and Bosworth Borough Council None Active				
Melton Borough Council None Active				
North West Leicestershire District Council				
Kegworth AQMA	Busy trunk road fronted by residential properties	26/07/2004		Nitrogen dioxide NO ₂
M1 AQMA	Motorway with selected close properties.	26/07/2004	11/07/2011	Nitrogen dioxide NO ₂
Castle Donington AQMA	An area encompassing the High Street and Bondgate area of Castle Donington. The northern extent of the AQMA has been amended to include the junction of Bondgate with The Spittal and the southern	09/01/2008	22/01/2013	Nitrogen dioxide NO ₂

	extent shall extend to the Moira Arms.			
Coalville AQMA	An area encompassing parts of Stephenson Way, Broom Leys Road and Bardon Road in Coalville.	09/01/2008	11/07/2011 08/02/2012	Nitrogen dioxide NO2
Copt Oak AQMA	An area encompassing 10 properties in the part of the village of Copt Oak that lies within the boundaries of NW Leicestershire District Council.	30/07/2009	22/01/2013	Nitrogen dioxide NO2
Oadby and Wigston District Council				
None Active				

Appendix 2.

Recommendations from NICE Guidance: Air pollution: outdoor air quality and health (NG70) 2017

1.1 Planning

1.1.1 Include air pollution in 'plan making' by all tiers of local government, in line with the Department for Communities and Local Government's [National Planning Policy Framework](#). This includes county, district and unitary authorities, as well as regional bodies and transport authorities. The [Local Plan](#) and other strategic planning processes (such as the core strategy, local transport plan, environment and health and wellbeing strategies) should include zero- and low-emission travel, for example cycling and walking (see [section 1.6](#) and NICE's guideline on [physical activity: walking and cycling](#)). Other strategies for zero- and low-emission travel could include:

- Providing charge points for [electric vehicles](#) in workplaces, commercial developments and residential areas.
- Supporting car sharing schemes or car clubs.

1.1.2 When 'plan making' consider:

- siting and designing new buildings, facilities and estates to reduce the need for motorised travel
- minimising the exposure of [vulnerable groups](#) to air pollution by not siting buildings (such as schools, nurseries and care homes) in areas where pollution levels will be high
- siting living accommodation away from roadsides
- avoiding the creation of street and building configurations (such as deep [street canyons](#)) that encourage pollution to build up where people spend time
- including landscape features such as trees and vegetation in open spaces or as 'green' walls or roofs where this does not restrict ventilation
- including information in the plan about how structures such as buildings and other physical barriers will affect the distribution of air pollutants.

1.1.3 If the local plan does not address air pollution, consider developing local guidance (such as supplementary planning documents, see the [Department for Communities and Local Government information on local plans](#)) on how to design buildings and spaces to improve local air quality until the local plan is amended.

See [how the committee made recommendations 1.1.1 to 1.1.3](#).

1.2 Development management

1.2.1 Consider ways to mitigate road-traffic-related air pollution. This could include:

- Taking action to reduce the number of motorised trips. For instance, by:
 - incorporating air quality outcomes in [travel plans](#)

- developing local parking plans
- supporting car clubs
- supporting active travel (see NICE's guideline on [physical activity: walking and cycling](#)).
- Supporting the use of zero- and low-emission vehicles for instance, by providing charging facilities for [electric vehicles](#).
- Managing street trees and vegetation to reduce the risk of restricting street ventilation, where this may contribute to poor air quality (for instance, by the choice of species, siting and pruning regimes).

1.2.2 In consultation with local communities, consider including air quality monitoring and measures to reduce road-traffic-related emissions in the Regulation 123 list of funding options for using the Community Infrastructure Levy (see the Planning Portal information on the [Community Infrastructure Levy](#)).

See [how the committee made recommendations 1.2.1 and 1.2.2](#).

1.3 Clean air zones

1.3.1 Consider introducing a clean air zone that:

- includes restrictions or charges on certain classes of vehicle
- supports zero- and low-emission travel (including active travel)
- includes targets to progressively reduce pollutant levels below EU limits and aim to meet [World Health Organization air quality guidelines](#)
- aims to reduce exposure to air pollution across the whole zone rather than focusing on air pollution hotspots.

1.3.2 Identify which classes of vehicles to restrict or charge in a clean air zone (see recommendation 1.3.1) based on an understanding of local conditions (such as local sources of road-traffic-related pollution and factors influencing dispersion). Use nationally recognised vehicle types (such as the [Euro classification for diesel and petrol vehicles](#)).

1.3.3 Work across local authority boundaries to address regional air pollution and prevent migration of traffic and emissions to other communities, resulting in areas of poor air quality.

1.3.4 Consider support for zero- and low-emission travel. This could include:

- Encouraging walking and cycling (see NICE's guideline on [physical activity: walking and cycling](#)).
- Encouraging uptake of zero- and low-emission vehicles, for instance:
 - Providing electric charging points.
 - Encouraging public and private sector organisations to use zero- or low-emission vehicles for deliveries to retail, office, residential or other sites in the zone, particularly for the last mile of deliveries in city centres.

- Developing integrated public transport networks (including park and ride schemes) based on low-emission vehicles.

1.3.5 Consider taking action to reduce emissions within the clean air zone. For instance:

- Introducing fuel-efficient driving initiatives including:
 - Bylaws and other action to support 'no vehicle idling' areas, particularly where [vulnerable groups](#) congregate (such as outside schools, hospitals and care homes) and in areas where exposure to road-traffic-related air pollution is high.
 - Driver training to reduce emissions (see [section 1.4](#)).
 - Actions to smooth traffic flow (see [section 1.5](#)).
- Action to minimise congestion caused by delivery schedules.
- Using a fleet recognition scheme (such schemes help fleet operators improve efficiency by reducing fuel consumption and emissions: the system recognises operators who meet best operational standards).
- Addressing emissions from public sector transport activities (see section 1.4).
- Specifying emission standards for private hire and other licensed vehicles.

1.3.6 Where traffic congestion is contributing to poor air quality, consider incorporating a congestion charging zone within the clean air zone.

1.3.7 Consider monitoring outside the zone to identify whether its implementation is causing problems in terms of traffic composition and flow. If so, address any issues identified. For instance, by changing the boundaries to address increased pollution at the margins of the zone or problems caused by diversion of traffic.

1.3.8 Assess the impact of any proposed charges (including exemptions for zero- and low-emission vehicles) on vulnerable groups.

See [how the committee made recommendations 1.3.1 to 1.3.8](#).

1.4 Reducing emissions from public sector transport services and vehicle fleets

Driver training

1.4.1 Consider introducing fuel-efficient driving as part of any test carried out when appointing or re-appraising staff who drive as part of their work.

1.4.2 Consider training staff drivers to reduce their vehicle emissions. This could include:

- reducing rapid accelerations and decelerations, and correct gear selection to improve fuel consumption
- switching off engines, if practical and safe, when parked by the roadside and when dropping off people or deliveries

- vehicle maintenance, including pumping up tyres to the recommended pressure
- emphasising that lower vehicle emissions will reduce both fuel costs and air pollution.

1.4.3 Consider using:

- 'in-vehicle' elements, for instance to ensure vehicles display real-time information about current fuel efficiency, appropriate gear selection and speed
- telematics technology to provide next-day information about driving style.

1.4.4 Consider monitoring fuel efficiency and providing feedback to drivers after training. This could include providing support from colleagues or 'buddies' to improve their driving style and rewards for those who drive efficiently (see NICE's guideline on [behaviour change: individual approaches](#)).

1.4.5 Consider monitoring the fleet's fuel consumption and evaluating the local effect on air pollutant emissions to demonstrate the benefits of training on fuel use and air quality.

Procuring public sector vehicles

1.4.6 Consider making low vehicle emissions (nitrogen oxides and particles) one of the criteria when making routine procurement decisions. This could include selecting low-emission vehicles, including [electric vehicles](#).

See [how the committee made recommendations 1.4.1 to 1.4.6](#).

1.5 Smooth driving and speed reduction

1.5.1 Consider promoting a [smooth driving](#) style by using:

- speed limits and average speed technology on the roadside
- real-time information to tell drivers what the current optimum driving speed is
- 20 mph limits without physical measures to reduce speeds in urban areas where average speeds are already low (below around 24 mph) to avoid unnecessary accelerations and decelerations
- signs that display a driver's current speed to reduce unnecessary accelerations.

See also recommendations 1.4.1 and 1.4.2.

1.5.2 Where physical speed reduction measures are used to reduce road danger and injuries (20 mph zones – see NICE's guideline on [unintentional injuries on the road](#)), consider using them to encourage drivers to maintain a reduced, steady pace along the whole stretch of road, rather than road humps that may increase acceleration- and braking-related emissions.

See [how the committee made recommendations 1.5.1 to 1.5.2](#).

1.6 Walking and cycling

1.6.1 Provide support for active travel (see NICE's guidelines on [physical activity: walking and cycling](#) and [physical activity and the environment](#)).

1.6.2 Provide a choice of cycle routes, including routes that avoid highly polluted roads. Ideally use quiet streets or segregated routes.

1.6.3 Where busy roads are used consider:

- Providing as much space as possible between the cyclist and motorised vehicles.
- Using dense foliage to screen cyclists from motor vehicles, without stopping air pollution from dispersing or reducing the visibility or safety of cyclists near junctions. Also take into account concerns about personal safety.
- Reducing the time cyclists spend at highly polluted sites, including some junctions, where this can be done without increasing the time that other groups spend exposed to poor air quality.

See [how the committee made recommendations 1.6.1 to 1.6.3](#).

1.7 Awareness raising

1.7.1 Base actions to raise awareness of road-traffic-related air pollution (and so change people's behaviour) on NICE's:

- guideline on [behaviour change \(general approaches\)](#)
- guideline on [behaviour change \(individual approaches\)](#)
- guideline on [community engagement](#) (in particular the section on a local approach to making community engagement an integral part of health and wellbeing initiatives).

1.7.2 Ensure healthcare professionals are aware that information on air quality is available, what it means for patients and what actions are recommended.

1.7.3 Consider providing information on air quality (using the Department for Environment, Food and Rural Affairs' [Daily Air Quality Index](#)) with weather forecasts and the pollen index. This could be provided through local, national and social media.

1.7.4 Consider providing information on:

- How health is affected by exposure to air pollutants in the long term as well as during specific periods of poor air quality.
- The impact of local pollution on air quality inside, as well as outside, a vehicle (levels of pollution are not always lower inside).
- How to reduce air pollutants and people's exposure, including the need to:
 - Reduce the number of motor vehicle journeys, if possible.
 - Drive in a style that minimises emissions by: avoiding rapid accelerations and decelerations, restricting the time spent with an engine 'idling' and ensuring the vehicle is correctly maintained (see the [Energy Saving Trust's driving advice](#)).
- Change routes to avoid highly polluted areas and adding to traffic congestion.

1.7.5 Consider public awareness initiatives such as car-free days or [National Clean Air Day](#) to raise awareness of air pollution.

1.7.6 Consider giving businesses information on how they can reduce road-traffic-related air pollution and improve fuel efficiency. For example, they could:

- help their drivers develop an energy-efficient driving style (see [section 1.4](#))
- schedule deliveries to minimise congestion
- encourage employees to cycle to work (see NICE's guideline on [physical activity: walking and cycling](#)).

Vulnerable groups

1.7.7 Healthcare professionals should be aware of [vulnerable groups](#) who are particularly affected by poor outdoor air quality. When notified of poor outdoor air quality, during any contact with vulnerable groups healthcare professionals should give general advice on how to avoid contributing to levels of air pollution and raise awareness of how to minimise exposure. This could include advice to:

- Avoid or reduce strenuous activity outside, especially in highly polluted locations such as busy streets, and particularly if experiencing symptoms such as sore eyes, a cough or sore throat.
- Use an asthma reliever inhaler more often, as necessary.
- Close external doors and windows facing a busy street at times when traffic is heavy or congested to help stop highly polluted air getting in.

(See also the Department for Environment, Food and Rural Affairs' [information about the Daily Air Quality Index](#).)

See [how the committee made recommendations 1.7.1 to 1.7.7](#).

Terms used in this guideline

This section defines terms that have been used in a specific way for this guideline. For general definitions, please see the [glossary](#).

Electric vehicles

Any vehicle that uses 1 or more electric motors for propulsion. It includes electric bikes and electrically assisted pedal cycles (see the [Highway Code information on Electric bikes: licensing, tax and insurance](#)).

Smooth driving

Driving in a way that assesses the road ahead to avoid unnecessary braking and acceleration, which increase the amount of fuel used and emissions.

Street canyons

Streets flanked by buildings on both sides. They can be categorised using the ratio of the height of the buildings to the width of the road, with a deep canyon having taller buildings relative to the width. The geometry of the canyon and its orientation to the prevailing wind influence the flow of air. This can lead to

the formation of vortices and the recirculation of air that trap pollutants emitted within the canyon. It can also restrict dispersion, potentially leading to areas of high air pollution.

Vulnerable groups

Children, older people and people with chronic health problems are among the most vulnerable to air pollution. Short-term (for example day-to-day) peaks of elevated air pollution are linked with increased hospital admissions for people with respiratory and cardiovascular conditions. The Royal College of Physician's report on air pollution ([Every breath we take: the lifelong impact of air pollution](#)) noted that it can affect the growth of an unborn baby and may be linked to premature birth.

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