

Oxfordshire County Council Air Quality Strategy 2023-2030

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Foreword

Air quality has been improving across Oxfordshire in recent decades. However, levels remain unacceptably high in many areas and it is the largest environmental risk to residents' health. It is critical that we work to improve air quality to deliver the council's priorities, particularly prioritising the health and wellbeing of residents.

We have already taken some bold steps to clean up the air in Oxfordshire. In June 2022, we were 1 of the 21 local authorities that signed a letter to the UK Environment Secretary George Eustice asking the government to bring forward the UK's PM_{2.5} target to 2030, in line with the World Health Organisation's interim guideline.

We are now demonstrating our commitment to addressing the air pollution crisis by seeking to meet the World Health Organisation (WHO) guidelines on deadly air pollution by 2030. It is crucial that we meet the WHO's guidelines as there is no safe limit of air pollution and concentrations above the WHO guideline are deadly.

Our vision is to accelerate the improvement in Oxfordshire's air quality to reduce the health and environmental impacts of dirty air, so ensuring that all residents can breathe safely.

This strategy outlines the approach we will take to improve air quality and is supported by a more detailed short term route map. It represents a call to action for the Council to make improving air quality a key objective of our work; individually and collectively we can and must take steps so that our residents are able to breathe safely.

Councillor Liz Leffman
Leader of Oxfordshire County Council



Introduction

A person at rest takes about 16 breaths per minute, this means we breathe about 960 breaths an hour and over 8.4 million breaths a year. A person who lives to 80 will take about 672 million breaths in a lifetime. The quality of the air we breathe is therefore everyone's business, and it is a fundamental building block to good health.

Poor air quality is the largest environmental risk to public health in the UK. Long term exposure to air pollution in England is equivalent to between 26,000 and 38,000 deaths per year¹. The true public health burden is likely to be even higher. For comparison, in the UK COVID-19 caused 70,000 deaths per year and in 2021 there were 9,641 deaths related to alcohol-specific causes². In Oxfordshire, it was estimated that air pollution's effect on mortality was equivalent to 320 early deaths at typical ages in 2021³.

Air pollution is a mix of particles and gases of both natural and human origin. These pollutants are emitted from a range of sources including agriculture, transport, industry, waste and domestic heating. Currently, there is no evidence of a safe level of exposure.

Air pollution has reduced significantly since the 1950s and air quality is good across most of Oxfordshire. Whilst there have been long-term reductions in the main air pollutants, recent trends show that there is still work to be done and some sectors and some geographic areas still suffer from poor air quality.

Awareness of poor air quality has increased in recent years in part due to high profile coroner rulings. In December 2020 a coroner ruled that air pollution was a cause of death of 9 year old Ella Kissi-Debrah in London in 2013⁴. In November 2022 a coroner found that 2 year old Awab Ishak died because of poor indoor air quality from mould⁵. These cases demonstrate the urgent need to address poor air quality and the growing legal recognition of the impacts of poor air quality on health.

Locally, the air quality context is complex. Oxfordshire is a relatively rural county with 40% of the population living in smaller towns and villages⁶. However, the county also contains some large urban centres including the city of Oxford.

Therefore, depending on where you are in the County, air pollution may be the result of different sources. This leads to the need to implement air quality measures that address each local context. For example, in urban centres, traffic and domestic combustion are the sectors that more strongly contribute to particulate matter and nitrogen dioxide emissions, whilst in rural areas it is important also to look at the contributions of agriculture and industry, as important sources of air pollution.

¹ Chief Medical Officer's annual report 2022: air pollution

² <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/alcohol-specificdeathsintheuk/2021registrations>

³ Oxfordshire Joint Strategic Needs Assessment 2023

⁴ <https://www.judiciary.uk/wp-content/uploads/2021/04/Ella-Kissi-Debrah-2021-0113-1.pdf>

⁵ https://www.judiciary.uk/wp-content/uploads/2022/11/Awaab-Ishak-Prevention-of-future-deaths-report-2022-0365_Published.pdf

⁶ <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/annualmidyearpopulationestimates/mid2017>

The air quality context is also complex because there are a range of partner organisations each responsible for different elements of air quality. The district and city councils have a statutory air quality duty, however many others including the county council have a responsibility to support and contribute to air quality work.

The county council through its crosscutting work has already implemented many actions that will help to tackle poor air quality. However, we recognise that there is scope to do more. This strategy is a first step towards improving work on air quality and raising awareness of air quality. It sets out our vision for air quality and a strategic approach to guide future work.

The strategy is supported by a route map that sets out what work we are already doing and the internal actions we will take in the short term. Moving forward a more comprehensive countywide strategy will be required with support from a range of stakeholders to truly deliver better air quality for all. We hope that this strategy will serve as a starting point and platform for enabling a countywide strategy.

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Context

This chapter provides more information about air quality in Oxfordshire. This is essential for helping us to understand what the problem is, why it needs to be addressed and how Oxfordshire County Council can take action. This chapter provides a summary of key information.

Policy context

Air quality policy begins at the international level. The Gothenburg Protocol is the key international directive. The protocol was first adopted in 1999 and sets emissions ceilings levels for various pollutants.

International regulations are implemented at the EU and national level through several directives. The UK has air quality laws originating from EU legislation in domestic legislation.

In addition, the UK has a number of unique acts and regulations. The Environment Act (1995) sets out the Local Air Quality Management (LAQM) process which requires local authorities to regularly review and assess air quality in their areas.

The Environment Act (2021) makes amendments to the LAQM process and gives greater powers to Local Authorities. It includes new legal responsibilities for county councils to actively support district and city council air quality work and sets legally binding air quality targets for PM_{2.5}.

The Environment Act also sets a new population exposure reduction target. The target is for a 35% reduction in population exposure by 2040 compared to a base year of 2018. This is an important move away from just using concentrations and will help to ensure that health benefits across the whole population are maximised.

At the local level there are a number of key strategies that provide further additional context for improving air quality. Some of these fulfil national requirements such as Air Quality Action Plans produced by the district and city councils. Others are unique to Oxfordshire such as the county council's Climate Action Framework adopted in 2020 and Local Transport and Connectivity Plan (LTCP) adopted in 2022.

The county council's strategic plan sets out a vision to lead positive change by working in partnership to make Oxfordshire a greener, fairer and healthier county. This strategy will help to deliver all aspects of this vision. The strategy also builds on the strategic priorities of the county council and will be key to delivering the following three:

- Tackle inequalities in Oxfordshire
- Prioritise the health and wellbeing of residents
- Create opportunities for children and young people to reach their full potential

Air pollution

Air pollution is a mix of particles and gases of both natural and human origin. The main components of air pollution are particulate matter (PM), nitrogen dioxide (NO₂),

sulphur dioxide (SO₂), ammonia (NH₃), non-methane volatile organic compounds (NMVOCs) and ozone (O₃)⁷.

Particulate matter is classified according to size, either as PM₁₀ which are particles of less than 10µm (micrometres) diameter or PM_{2.5} which are particles of less than 2.5µm diameter. There is most evidence for health harms associated with PM_{2.5}.

These air pollutants are emitted from a range of sources including agriculture, transport, industry and domestic heating, including solid fuel burning. Currently, there is no clear evidence of a safe level of exposure.

Air pollution is divided into two different types which we have defined below:

- Outdoor air pollution – Air pollution that we breathe when outdoors such as emissions from transport, domestic heating, industry and natural sources.
- Indoor air pollution – Air pollution that we breathe when inside buildings such as your home, transport environment or workplace⁸. This includes outdoor pollutants that have entered the indoor environment and indoor sources such as mould, cooking, heating, household products and fuel burning appliances⁹.

⁷ UK government: Clean Air Strategy 2019

⁸ <https://www.blf.org.uk/support-for-you/indoor-air-pollution/about-indoor-air-pollution#:~:text=Indoor%20air%20pollution%20is%20dust,of%20heart%20disease%20and%20stroke.>

⁹ https://uk-air.defra.gov.uk/assets/documents/reports/cat09/2211011000_15062022_Indoor_Air_Quality_Report_Final.pdf

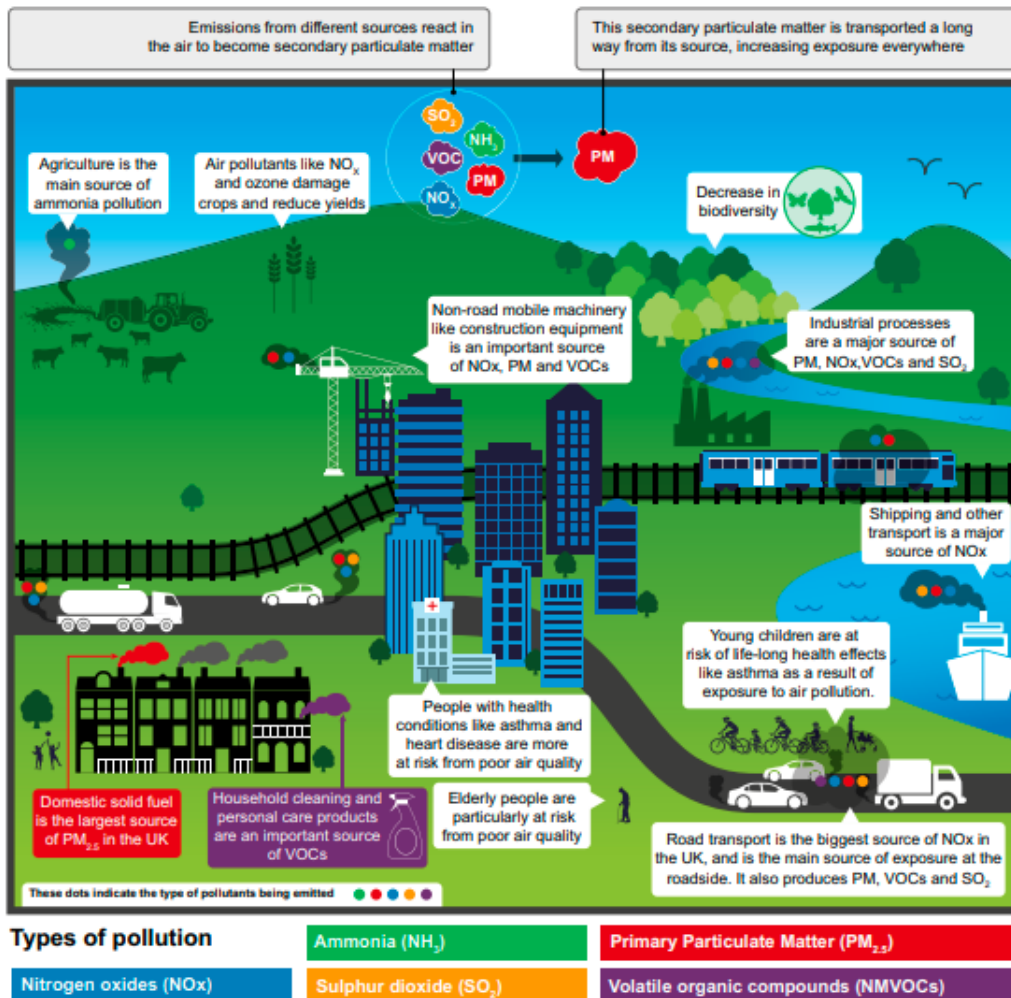


Figure 1 – Sources of air pollutants in the UK¹⁰

Air pollution trends

Air pollution has reduced significantly since the 1950s. Emissions of most outdoor air pollutants are at the lowest they have been since measurements began. Historic trends in the UK for each pollutant can be found on the UK government website [here](#).

Whilst there have been long-term reductions in the main air pollutants, recent trends show there is still work to be done. Over the last 10 years, ammonia emissions have remained largely the same and the rate of particulate matter reductions has reduced.

Indoor air quality has also been a growing area of focus. As outdoor air pollution falls, indoor air pollution becomes a greater proportion of the problem. However, the path to improvement is not as clear as for outdoors, and further research will be needed¹¹.

Health impacts of air pollution

The health impact of long term exposure to air pollution in England is estimated to be equivalent to between 26,000 and 38,000 deaths per year¹². Most of this health impact is attributable to long-term PM_{2.5} exposure.

¹⁰ UK government: Clean Air Strategy 2019

¹¹ Chief Medical Officer's annual report 2022: air pollution

¹² Chief Medical Officer's annual report 2022: air pollution

In addition, long-term exposure to air pollution can cause chronic conditions and has negative effects on physical and mental health throughout the course of our lives. The health effects linked to air pollution are summarised on figure 2 below.

The health impacts of air pollution are also not equal. Some population groups are particularly susceptible to the health impacts of air pollution. These groups include children, pregnant women, people in lower socio-economic groups and people from a non-white ethnic background.

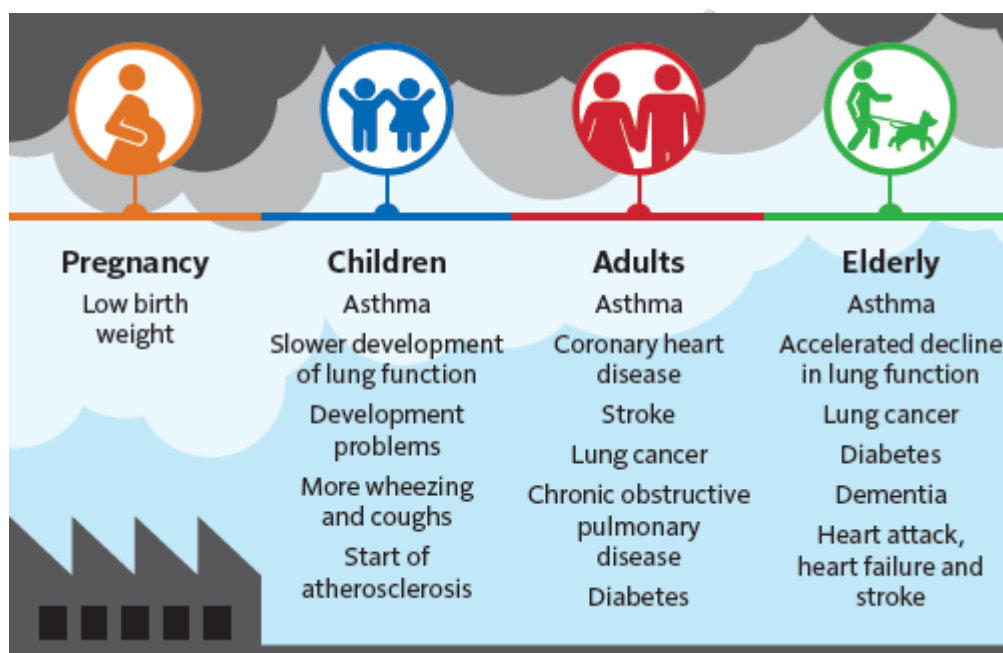


Figure 2 – Health effects of air pollution throughout life¹³

World Health Organisation guidelines

As well as the legally binding air quality legislation covered previously, there is also international guidance developed by the World Health Organisation (WHO). The WHO health-based guidelines provide guidance on thresholds and limits for key air pollutants that pose health risks. These reflect the scientific evidence base for health harms and were updated in 2021¹⁴.

These are only guidelines and are not legally binding unless a country chooses to adopt them into its own legislation. The WHO guideline levels for different air pollutants are shown below, along with comparison to the UK legal target values.

Pollutant	Averaging time	UK legal target value	WHO guideline
PM _{2.5} µg/m ³	Annual	10 (by 2040)	5
	24-hour	N/A	15
PM ₁₀ µg/m ³	Annual	40	15
	24-hour	50	45
O ₃ µg/m ³	Peak season	N/A	60

¹³ Chief Medical Officer's annual report 2022: air pollution

¹⁴ <https://apps.who.int/iris/handle/10665/345329>

	8-hour	100	100
	Annual	40	10
NO ₂ µg/m ³	Hourly	200 (not to be exceeded more than 18 times per year)	200
	24-hour	N/A	25
SO ₂ µg/m ³	24-hour	125	40
CO mg/m ³	24-hour	10	4

Environmental Impacts of air pollution

Air pollution also has negative effects on the environment. Nitrogen dioxide and particulate matter can reduce crop yield and plant growth efficiency. Similarly, sulphur dioxide emissions can cause acidification of soil and acid rain.

Wildlife is also negatively affected by air pollution. Animals can develop health problems when exposed to high levels of pollutants including reproductive failure and birth effects. The impacts of air pollution on water can impact fishes and their productivity potential.

Air pollution and climate change

Air pollution and climate change are closely linked but it is important to recognise there is a difference between the two issues and their potential solutions. Climate change is the large-scale, long-term shift in the planet's weather patterns and average temperatures. Climate change is primarily caused by the release of greenhouse gases, namely carbon dioxide, into the atmosphere by humans.

Many interventions to reduce greenhouse gas emissions also improve air quality. Particularly positive for air quality are those decarbonisation actions that lead to the replacement of combustion systems with non-combustion alternatives¹⁵.

However, it is important to recognise that there are differences and potential conflicts. Carbon dioxide is one of the primary greenhouse gases, but it is not considered an air pollutant. Decarbonisation work will largely have positive impacts for air quality but not in every case and there may be air pollutants that require different solutions.

Air quality duties in Oxfordshire

In Oxfordshire, the district and city councils are required to monitor air quality within their respective areas. Where air quality objectives are not being met, they must identify and declare Air Quality Management Areas (AQMAs). Once declared, they must develop Air Quality Action Plans (AQAP) and produce annual air quality status reports (ASR) for Defra. Information, ASRs, AQAPs and data about Oxfordshire's air quality can be found on the Oxfordshire Air Quality [website](#).

In addition, the district and city councils respond to planning applications to mitigate and address any adverse impacts on local air quality, review and create air quality planning policies, review air quality assessments and produce air quality guidance.

¹⁵ Chief Medical Officer's annual report 2022: air pollution

This strategy seeks to support the work done by district and city councils and help them to fulfil their statutory air quality responsibilities. It sets out a strategic approach to help guide and coordinate future county council work.

Oxfordshire air quality trends

Monitoring results generally show that NO₂ levels have been decreasing across the county over the last 5 years. Oxfordshire currently has 13 designated AQMAs, the last AQMA to be declared was in 2015. These are all in relation to exceedances of the legal limit for annual average NO₂. Emissions from transport are the primary contributor to all 13 AQMAs. In 2021, 11 AQMAs were in compliance with the UK's annual target value of 40 µg/m³ for NO₂ but none meet the WHO guidance annual value of 10 µg/m³.

PM is only regularly monitored by Oxford City Council in Oxfordshire. The annual average levels of PM_{2.5} measured in 2021 were 7 µg/m³. This is well within compliance with the UK's annual target value of 25 µg/m³ but does not meet the WHO guidance annual value of 5 µg/m³. Local research has also found levels in some areas of Oxford City are consistently above 7 µg/m³ demonstrating there are differences within the city¹⁶.

Oxford City Council's most recent source apportionment study found that domestic combustion is by far the largest contributor to particulate matter emissions in Oxford, contributing approximately 66% of PM_{2.5} emissions. Road transport only accounts for approximately 10% of total local emissions of particulate matter¹⁷.

An indicative overview of air quality across Oxfordshire is shown on the map below. This map combines modelled air pollution data from Defra (NO₂, PM_{2.5} and PM₁₀) to create a composite air quality 'score'. The most polluted square is given a value of 1.0, and all the other squares are assigned a value relative to that. It is important to note that this data is an estimation using modelling. Modelled data helps to provide a wider assessment of the state of air quality as we do not have monitors in all locations across the county.

¹⁶ Paper currently under review

¹⁷ https://www.oxford.gov.uk/downloads/file/7320/oxford_source_apportionment_study

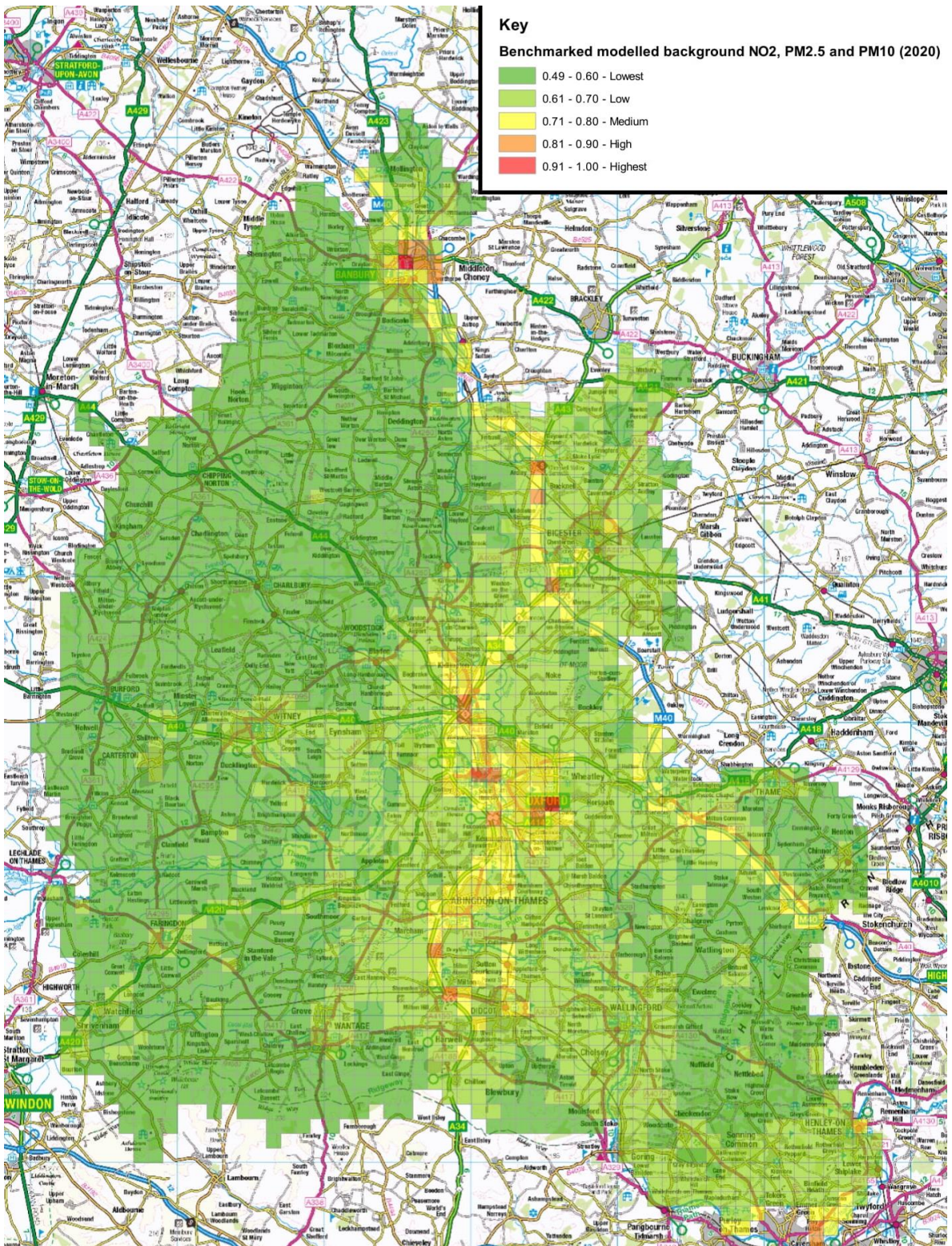


Figure 3 – Oxfordshire modelled air pollution data from Defra (NO₂, PM_{2.5} and PM₁₀) and composite air quality 'score', 2020

Oxfordshire health impacts

In Oxfordshire, it was estimated that air pollution's effect on mortality was equivalent to 320 early deaths at typical ages in 2021¹⁸. For context, there are approximately 5,500 deaths per year in Oxfordshire¹⁹.

As of 2021, the Public Health Outcomes Framework indicator Fraction of mortality attributable to particulate air pollution for Oxfordshire was 5.5%. Applying this fraction to the Oxfordshire age standardised mortality rate for people aged under 75, gives an estimated standardised mortality rate attributable to PM_{2.5} per 100,000 of 14.7 in Oxfordshire. Figure 4 below shows how this mortality rate compares with other rates for the population aged under 75²⁰.

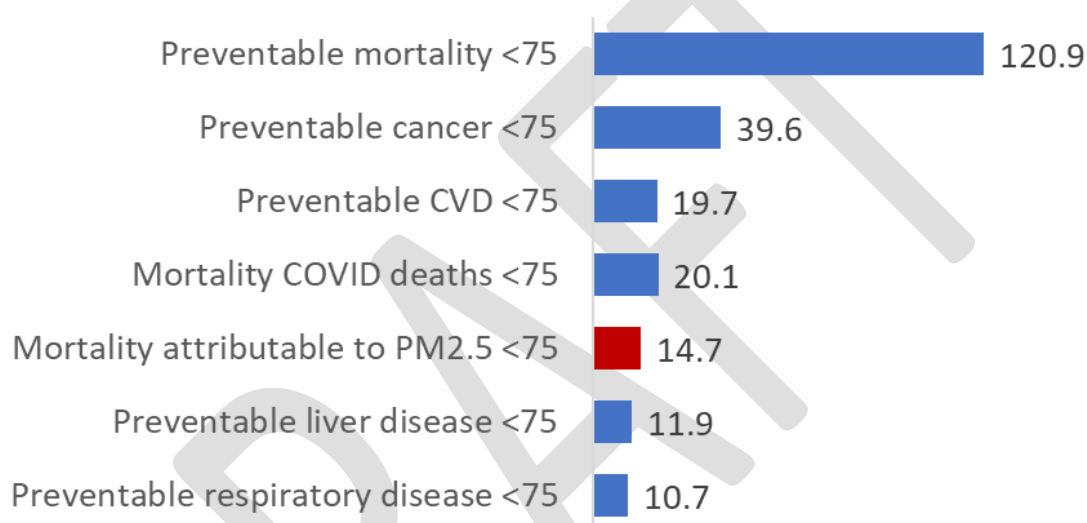


Figure 4 – Oxfordshire age standardised mortality rate per 100,000

Furthermore, over 2,300 years of healthy life (DALYs) were lost due to air pollution in 2019. These were mainly attributed to cardiovascular diseases and chronic respiratory diseases²¹.

Whilst the health impacts of air pollution in Oxfordshire have decreased since 1990, the improvements have stalled since 2014 highlighting that there remains significant work to do and health benefits to be gained.

¹⁸ Oxfordshire Joint Strategic Needs Assessment 2023

¹⁹ Oxfordshire Joint Strategic Needs Assessment 2023

²⁰ Uses method set out in [Air Quality Briefing for Directors of Public Health March 2017](#)

²¹ Oxfordshire Joint Strategic Needs Assessment 2023

Vision and objectives

The intent and purpose of this work is to identify the impacts the county council can have on air quality, both positive and negative, and to support the work done by the district and city councils to improve air quality and help them to fulfil their statutory air quality responsibilities.

Through improving communication around air quality, we can work better together, internally and with external partners. The county council not only delivers services and interventions but also can act as a leader to improve air quality.

We have developed an aspirational vision for air quality in Oxfordshire. It outlines what we are working towards, sets the scale of change required and will help to ensure consistency between short term route maps. It will require us to work in partnership with the district and city councils and other stakeholders to deliver this ambition.

In support of the vision, we have identified our objectives. These are the specific areas that we are seeking to address. These inform the internal actions that we will be taking to work towards delivery of the vision.

Vision

“Our vision is to accelerate the improvement in Oxfordshire’s air quality to reduce the health and environmental impacts of dirty air, so ensuring that all residents can breathe safely.”

Objectives

- Work in partnership to support the work to improve air quality undertaken by the district and city councils. We will work with air quality partners to:
 - Inform an evidence-based approach to air quality actions by increasing our understanding of the state of air quality in Oxfordshire and the impact of measures to improve air quality.
 - Identify and prioritise action in locations which are particularly vulnerable to air pollution impacts.
 - Raise public awareness of air quality and indoor air pollution, the impacts on health and personal protection measures recommended in order to promote sustainable behaviour change.
- Work with air quality partners to maintain a downward air pollution trajectory and develop population exposure targets. We will work with air quality partners to:
 - Reduce annual mean PM_{2.5} concentration to 5 µg/m³ or less by 2030.
 - Reduce emissions of Nitrogen oxides (NO_x) by 73% by 2030 relative to 2005 levels.
 - Work towards air quality that meets the World Health Organisation (WHO) guidelines by 2030.
 - Conduct population exposure modelling and develop quantified local population exposure targets for PM_{2.5} and NO_x.
- Deliver the Oxfordshire County Council Air Quality Strategy Route Map. We will work to:

- Support the ongoing delivery of work linked to air quality and increase consideration of air quality in decision making.
- Provide a more coordinated approach to supporting action to improve air quality.
- Work with partners to secure funding to deliver new projects on air quality.

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Strategic approach

This chapter outlines the strategic approach that we will be taking to realise the vision and objectives. This is a high-level approach that will help to guide future work on air quality in the county and the actions we will be taking. It will be supported by more detailed route maps which are introduced in the next chapter.

The approach that we will be taking to improve air quality is grouped into three areas which are listed below in order of priority²²:

Reduce – Reduce emissions of indoor and outdoor air pollution

We will first work to reduce or remove the source of air pollutants. This will reduce the level of air pollution and improve residents' health, especially the most vulnerable. Reducing emissions from road transport is a key area of focus that we can help to deliver as the highway authority. Reducing emissions will be enabled through delivery of the LTCP including actions such as:

- Measures to reduce demand for vehicle use.
- Measures to promote sustainable and active travel.
- Traffic management measures to reduce congestion and vehicle idling.

Extend – Extend distance from pollution sources

Where it is not possible to reduce emissions, we will work to extend the distance between emission sources and human receptors. Pollutant concentration is highest close to the emissions source but decreases with distance. Increasing the distance therefore helps to reduce the pollutant concentration at the point of exposure. Extending distance from pollution sources will be enabled through actions such as:

- Reprioritisation of road space to sustainable and active travel.
- Traffic, congestion and demand management measures to help keep vehicle traffic away from residential areas.
- Working with our district and city councils on spatial planning to encourage residential, education or leisure facilities to be situated away from major roads.

Protect – Protect those most at risk

Finally, we will work to protect the most vulnerable residents. Children, pregnant women, the elderly and those with existing health conditions are most vulnerable to the negative health impacts of air pollution. We will therefore work to protect these groups when it is not possible to reduce emissions or extend the distance from them. Protecting those most at risk will be enabled through actions such as:

- Communicating information about high air pollution days and indoor air pollution.
- Partnership working with stakeholders such as the local NHS on joint campaigns.
- Conducting behaviour change work with schools and influencing the design of transport schemes near school sites and location of care homes.
- Provide energy efficiency advice and retrofit programmes for those in fuel poverty, including indoor air pollution as a consideration.

²² http://epapers.bham.ac.uk/3069/1/Ferranti_etal_2019_FirstStepsAQ.pdf

Route map

This strategy is supported by a route map which is published as a separate supporting document. The route map outlines the internal actions we will be taking in the short to medium term to deliver the strategy.

The route map has been published as a separate document so that it can be reviewed and updated without requiring any changes to this strategy. Our vision and strategic approach will remain the same, however the work we are conducting, and actions required will change over time.

The actions are all related to functions directly within Oxfordshire County Council's control. This is a first step to improving our work on air quality and meet the requirements for county councils set out in the Environment Act 2021. Moving forward, joint working and shared actions will be required with a range of stakeholders to truly deliver our vision for air quality.

The route map is structured according to our strategic approach and identifies those actions that we will be taking to reduce, extend and protect against air pollution. Within this, we have grouped the actions into key areas that are either local drivers or enablers of air quality.

We have grouped the actions in this way to reflect the diverse range of issues and work being conducted within the broader reduce, extend, protect framework. We have identified the work already underway and actions we will be taking in each section. We have included partnership working and monitoring as their own sections due to their cross cutting impacts on all work.

Monitoring, learning and implementation

This strategy outlines the importance of air quality to human health and the urgent need for action to tackle poor air quality in Oxfordshire. It also outlines the role the county council can play in tackling air pollution and a strategic approach for improving air quality. The strategy is supported by our route map that outlines the work we are already doing and the internal actions we will take to improve our work in the short term.

This strategy has been approved by the county council's cabinet to provide visibility and transparency about the actions we will be taking. Moving forward, we will use the Oxfordshire Health Protection Forum to provide oversight and accountability for the strategy and the actions in it.

The forum will be used to monitor progress on an annual basis. It is also planned that public reporting of progress on the actions is linked to the annual Clean Air Day, to help raise awareness of air quality.

The Health Protection Forum is chaired by the director of public health from the county council and includes representatives from the NHS and Public Health England. The forum helps to ensure that the local authority and local partners are implementing preventative strategies to tackle key threats to the local population.

The forum reports into the Health Improvement Board, which in turn reports to the Health and Wellbeing Board. It is therefore well placed to inform all of the health governance structures in the county and raise the profile of air quality. The Place Programme Partnership and/or Health and Overview Scrutiny Committee may also wish to review the progress and outcomes of the strategy.

As part of the annual review, progress made on delivering the route map will be reviewed. The route map is short term and so there will be an opportunity for it to be updated or a new route map developed to reflect changing work and progress made on delivering the overall vision.

The route map includes sections on partnership working and monitoring as these will be key to delivering the vision throughout the strategy's duration. As these actions are delivered, they will help us to continually improve our monitoring, learning and implementation process.