

WM-AIR



WM-AIR@CONTACTS.BHAM.AC.UK



@WMAIR\_UOB



WM-AIR.ORG.UK

# Providing Air Quality health impact evidence: The Air Quality Lifecourse Assessment Tool (AQ-LAT) for the West Midlands Combined Authority (WMCA) area

Dr James Hall on behalf of Dr Suzanne Bartington, Dr Jian Zhong, Dr Catherine Muller, Prof. Neil Thomas, Prof. Sue Jowett and the WM-AIR team



UNIVERSITY OF  
BIRMINGHAM

WM-AIR  
CLEAN AIR SCIENCE FOR  
THE WEST MIDLANDS

# Rationale for the AQ-LAT

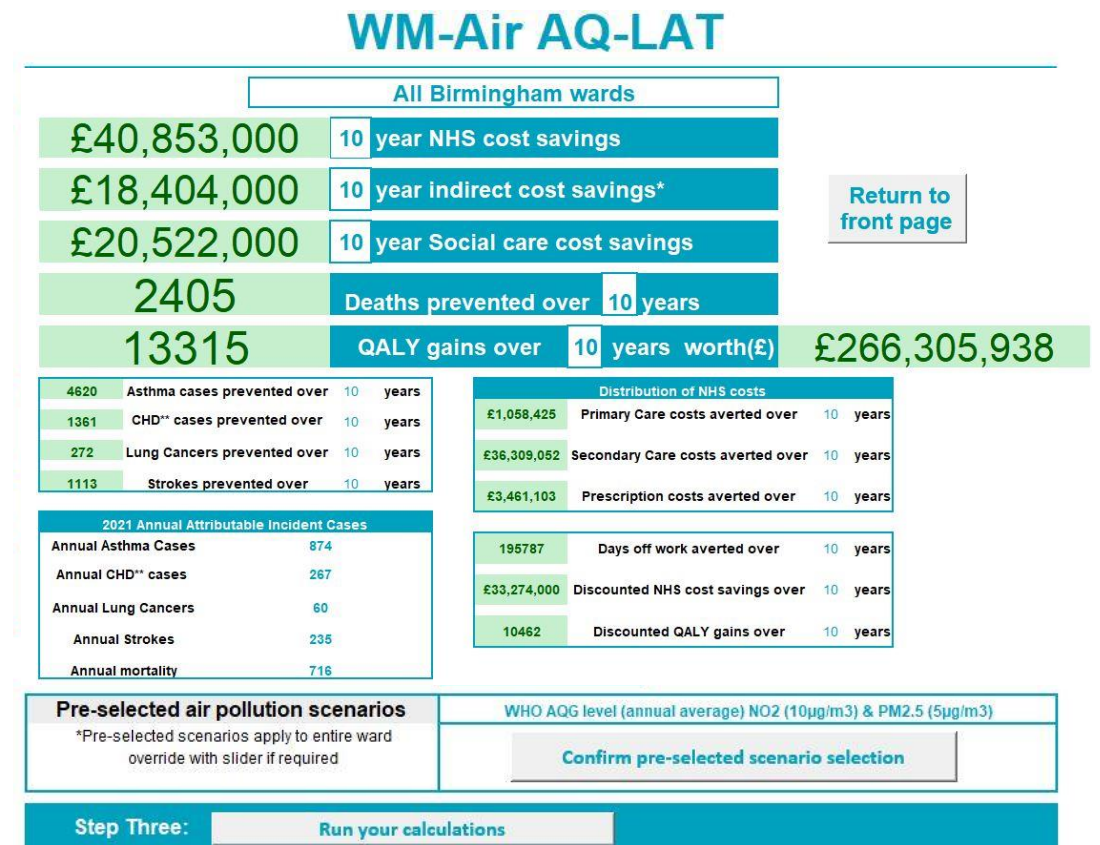
- Air pollution shortens **life expectancy** and increases chance of getting a **chronic disease**
- **Health impact assessment** formal requirement for most investment decisions (including clean air)
- Local authorities can also use evidence on economic benefit to **support business cases**
- Increased focus on mitigation policy further motivates **need for local health impact assessment tools**

# Codesigning the AQ-LAT for impact

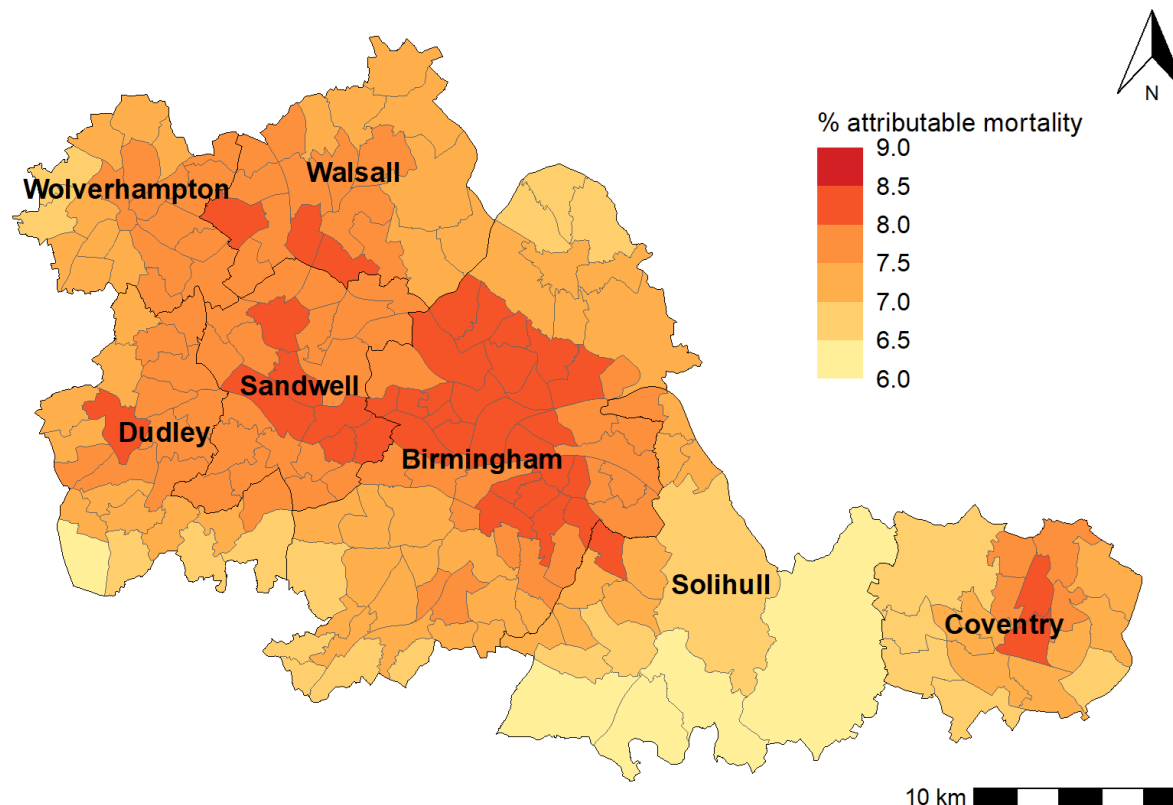
- The AQ-LAT Tool was codeveloped with end-users
- Outcomes relevant to local decision makers

*“Its design has been Local Authority/Health practitioner driven allowing councils to use ward-based criteria or recognised statutory reporting geographical areas... for outputting of data.”*

Amanda Clover MCIEH CEnvH MIOA (Senior Development Officer (Air Quality) – Enforcement, Monitoring and Compliance), Solihull Council



# Working with policymakers to drive policy change



Percentage of early deaths attributable to air pollution at ward level in the WMCA (2019)

- Tool estimates up to 2300 deaths attributable to poor air quality in WMCA
- Estimates used in 2023 WMCA Air quality framework
- Need to address PM2.5 particularly influential in the framework

# Infographics for public facing messaging



## Health burden due to air pollution

Air pollution causes 1584-2311 early deaths in the West Midlands each year in the



Stroke in up to 1,000 people each year

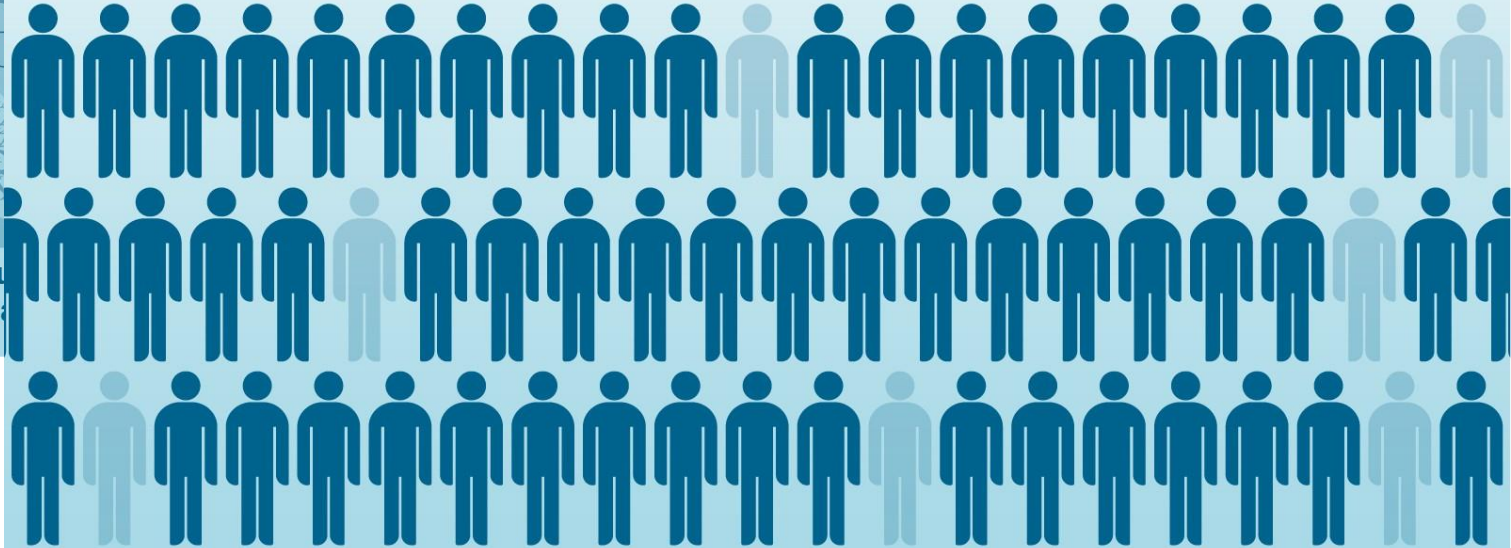


Asthma in up to 3,300 people each year



## Poor air quality and early deaths

Air pollution causes 1584-2311 early deaths in the West Midlands each year.



# Working with policymakers to drive policy change

- Briefing notes and tailored impact reports for Birmingham and Coventry City Councils to highlight inequalities
- Individualised Walsall-LAT produced for Walsall council
- Used across the region



Hall, J., Zhong, J., Harrison, R., Baldo, C., Jowett, S., Mazzeo, A., Bartington, S.E. & the WM-Air Team. Health Impacts of Air Pollution in Birmingham. WM-Air Briefing Note B34-CS-2023-07, June 2023. WM-Air Project, University of Birmingham. Funding provided by NERC grant NE/R010448/1. <https://doi.org/10.25561/air-e070>

## HEALTH IMPACTS OF AIR POLLUTION IN BIRMINGHAM

Dr James Hall<sup>a</sup>, Dr Jian Zhong<sup>b</sup>, Prof. Roy Harrison<sup>c</sup>, Dr Clarissa Baldo<sup>d</sup>, Prof. Sue Jowett<sup>a</sup>, Dr Andrea Mazzeo<sup>e</sup>, and Dr Suzanne Bartington<sup>d</sup>

<sup>a</sup>Health Economics Unit, Institute of Applied Health Research, University of Birmingham, Edgbaston Park Road, Birmingham, B15 2TT, UK  
<sup>b</sup>School of Geography, Earth and Environmental Sciences, University of Birmingham, Edgbaston Park Road, Birmingham, B15 2TT, UK, Institute of Applied Health Research, University of Birmingham, Edgbaston Park Road, Birmingham, B15 2TT, UK  
<sup>c</sup>Department of Environmental Sciences, Faculty of Meteorology, Environment and Arid Land Agriculture, King Abdulaziz University, Jeddah, Saudi Arabia  
<sup>d</sup>Institute of Applied Health Research, University of Birmingham, Edgbaston Park Road, Birmingham, B15 2TT, UK

### WM Air Briefing Note B34-CS-2023-07, June 2023.

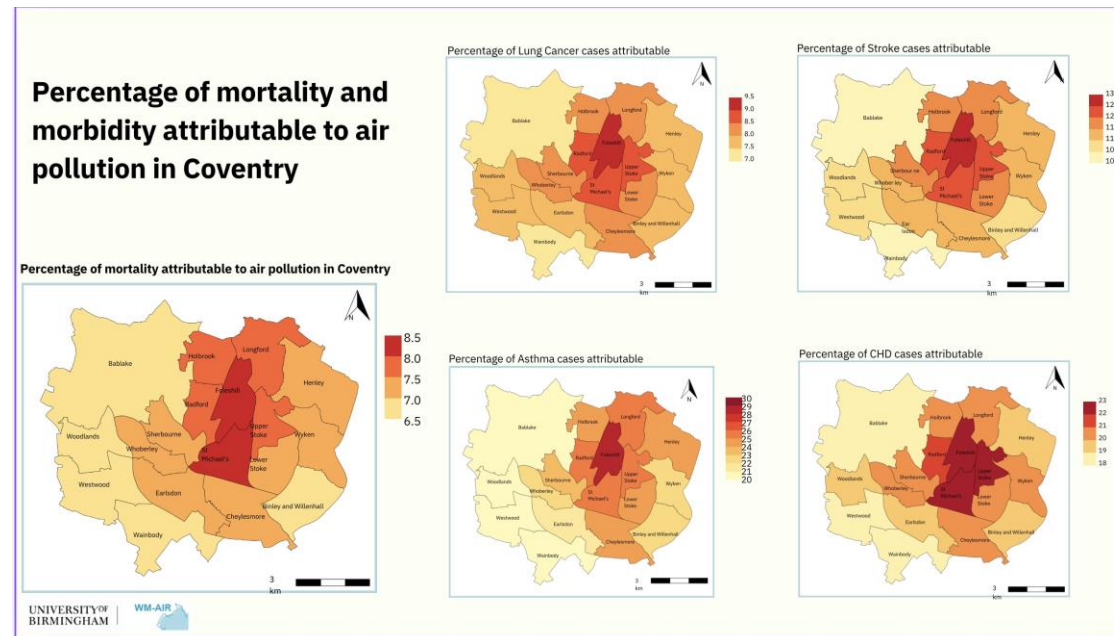
Contact: <https://wm-air.org.uk>; @WMAir\_UoB; [wmair@contacts.bham.ac.uk](mailto:wmair@contacts.bham.ac.uk)

WM-Air - Clean Air Science for the West Midlands ([wm-air.org.uk](https://wm-air.org.uk)) is a NERC funded initiative, led by the University of Birmingham. The programme, in collaboration with over 20 cross sector partners, applies environmental science expertise to support improvement of air quality, health, environmental and economic benefits, in the West Midlands.

Research conducted by WM-Air has quantified the impacts of air pollution in Birmingham on a range of health conditions – including asthma, heart disease, stroke, lung cancer and risk of early death. Calculations were performed using the Air Quality Life Assessment Tool (AQ-LAT) developed within the WM-Air programme. For a detailed description of methods and to download the tool visit <https://wm-air.org.uk/project/health/>.

#### Health Impacts of Air Pollution in Birmingham - Summary

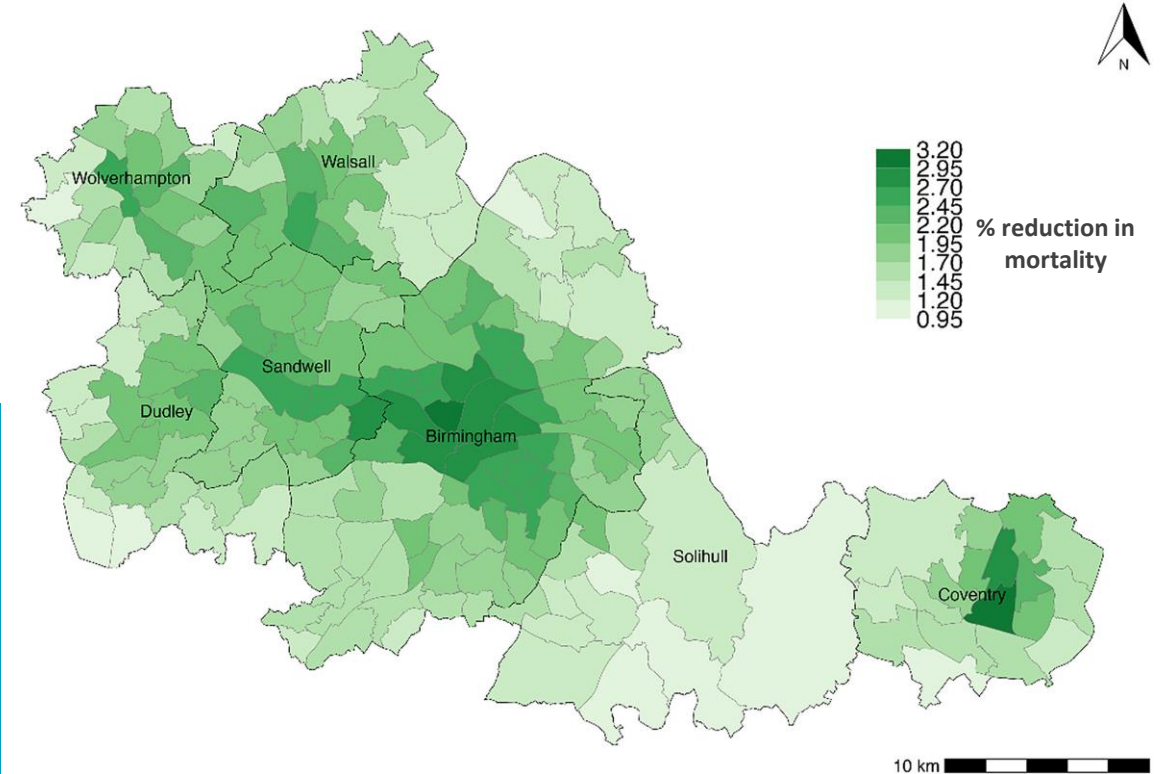
- Our research shows that each year air pollution in Birmingham contributes to:
- **720 (between 561 and 802) early deaths, equivalent to 7900 lost years of life** among the city population<sup>1</sup>
  - **900 (between 312 and 1360) new asthma cases** among children and adults
  - The highest proportion of disease cases and early deaths attributable to air pollution is distributed within 40 wards clustered around the **city centre**



# Evidence to inform air quality policy decisions

- AQ-LAT can also help local decision makers estimate **scale and distribution** of health impacts of interventions

*“AQ-LAT is an example of where the knowledge and skills ... have been translated into an actionable tool for ward-level insight into the health impacts of different AQ scenarios over time. Such intelligence is vital for planning and policymaking”* Steve Arnold (Head of CAZ), Birmingham City Council



% reduction in attributable mortality in complying with 2021 WHO Global Air Quality Guidelines in WMCA

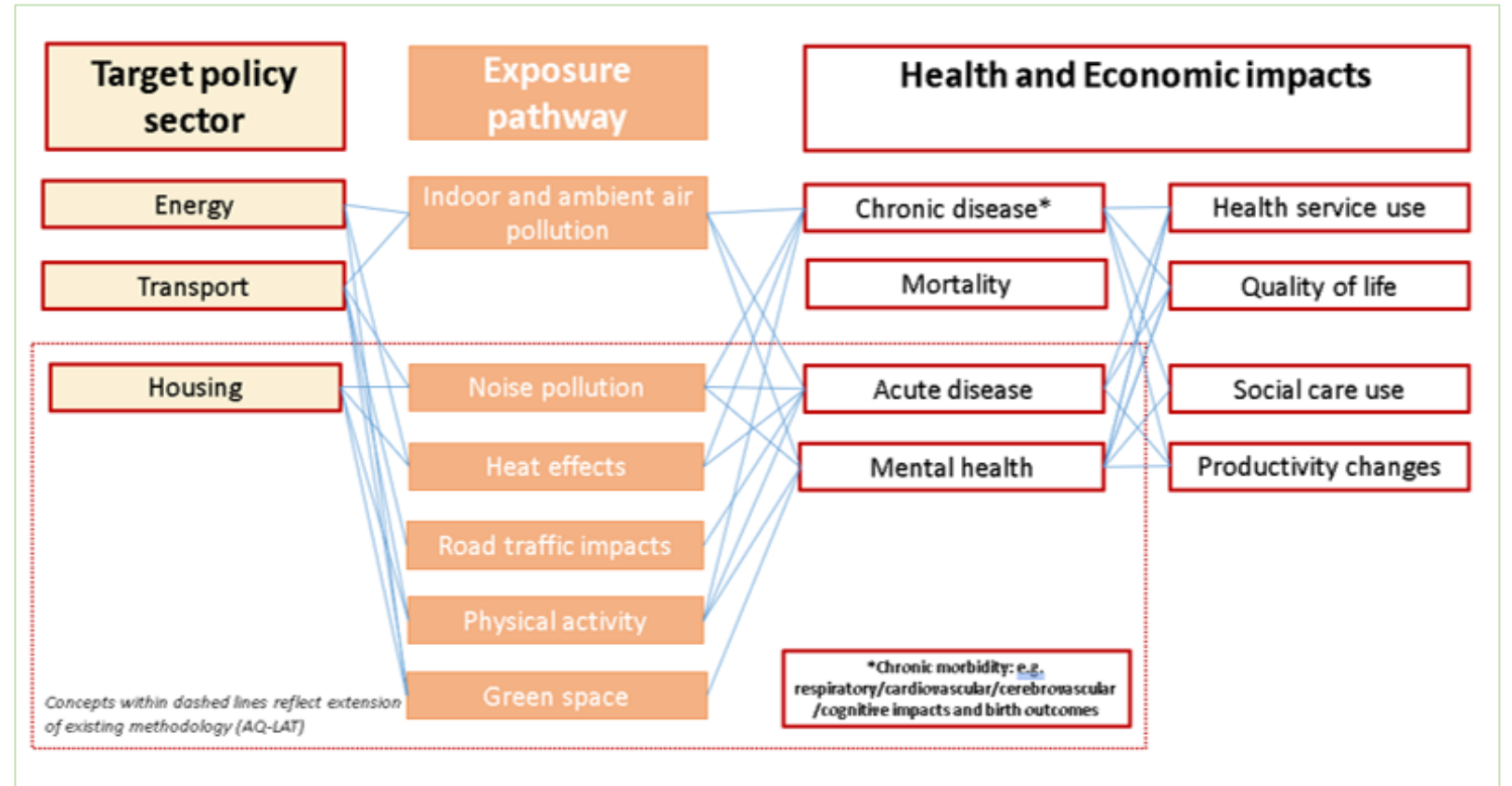
# Lessons learned

- Need to involve more stakeholders in the design stages to increase applicability, usability, and use
- Important to consider the user experience when designing the tool, specifically usability and visual aspects
- Improved utility to generate reports and data visualisations for users
- Possibility of generating qualitative output
- Interest in LSOA level analyses



# Future directions: Evolve

## WM-NET ZERO CLIMATE-LAT



# Future directions: Expand coverage

## Oxfordshire AQ-LAT

Step One: Select District, MSOA, Discount Rate and Time Horizon

<b>District</b>	Cherwell
<b>Ward</b>	Cherwell all wards
<b>Time Horizon</b>	20 years <span style="float: right;">Maximum: 30 years</span>
<b>Discount Rate Costs</b>	3.5% <span style="float: right;">Default: HM Treasury Green Book rate 3.5%</span>
<b>Discount Rate QALYs</b>	1.5% <span style="float: right;">Default: HM Treasury Green Book rate 1.5%</span>

<b>Cherwell all wards</b>	
PM2.5 annual average concentration at baseline (2022)	7.28 $\mu\text{g}/\text{m}^3$
NO2 annual average concentration at baseline (2022)	7.37 $\mu\text{g}/\text{m}^3$

Step Two: Either customise local air quality target, OR use a pre-selected scenario

<b>PM2.5 Target (<math>\mu\text{g}/\text{m}^3</math>)</b>	5.00	<small>Values change automatically if scenario selected</small>
<b>NO2 Target (<math>\mu\text{g}/\text{m}^3</math>)</b>	6.00	<small>Values change automatically if scenario selected</small>
<b>Target Population (%)</b>	100 %	<small>Values change automatically if scenario selected</small>

OR

<b>Pre-selected air pollution scenarios</b>	<b>WHO AQG level (annual average) PM2.5 (<math>\mu\text{g}/\text{m}^3</math>)</b>
<small>*Pre-selected scenarios apply to entire ward override with slider if required</small>	<b>Confirm pre-selected scenario selection</b>

Step Three: Run your calculations



Department  
for Environment  
Food & Rural Affairs



Department  
for Transport

