



UNIVERSITY OF
BIRMINGHAM



Using AQ-LAT to assess Health Impacts of Air Pollution in the West Midlands Region

Dr James Hall
Dr Suzanne Bartington
Dr Joe Acton
Dr Jian Zhong
Professor Neil Thomas
Dr Andrea Mazzeo
Professor Roy Harrison
Dr Nicole Cowell
Dr Clarissa Baldo
and Professor Sue Jowett

WM-AIR
CLEAN AIR SCIENCE FOR
THE WEST MIDLANDS





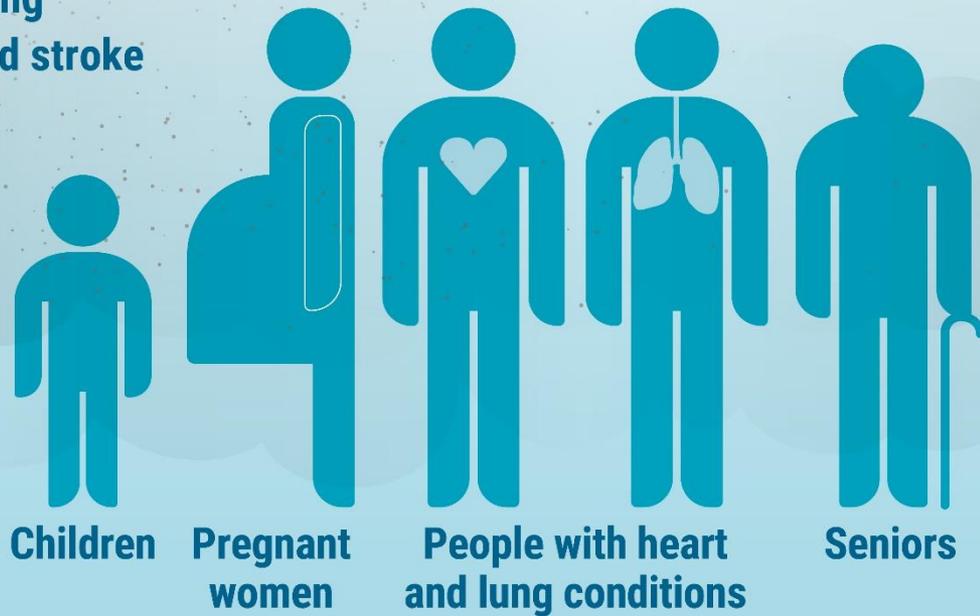
UNIVERSITY OF
BIRMINGHAM

Air pollution in the West Midlands: a major public health issue

Air pollution can cause:

- Eye, nose and throat irritation
- Difficulty breathing
- Heart disease and stroke
- Asthma
- Lung cancer

Who is most affected?



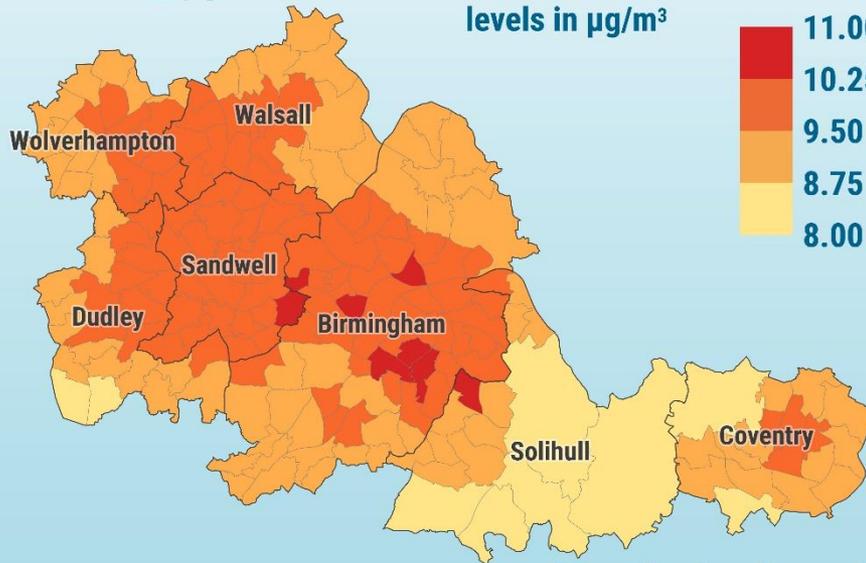
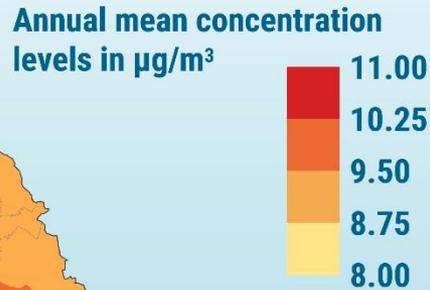
WM-AIR



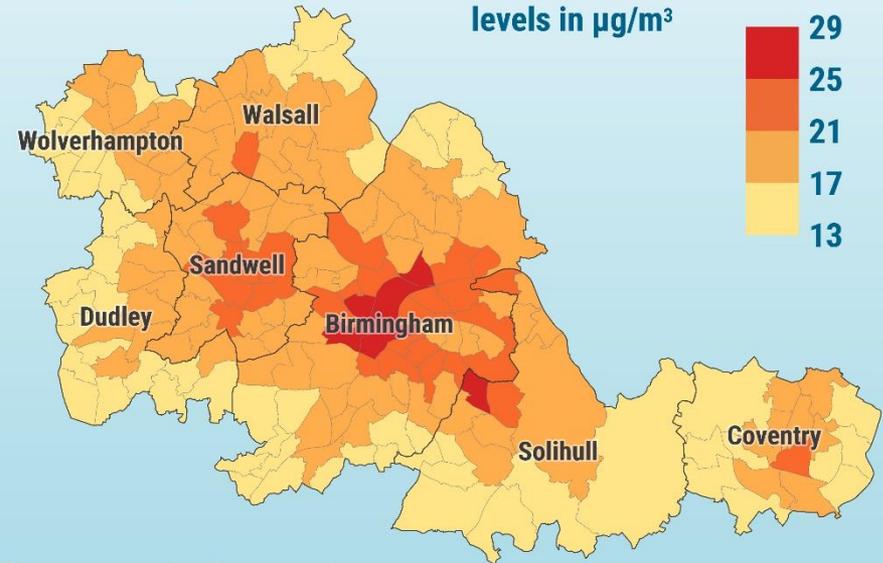
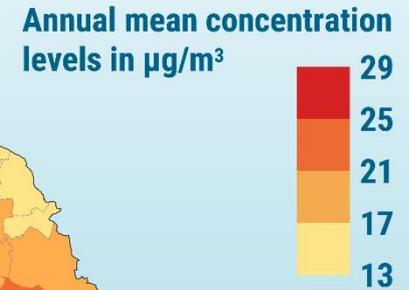


PM_{2.5} and NO₂ are the main air pollutants in the West Midlands

PM_{2.5}



NO₂



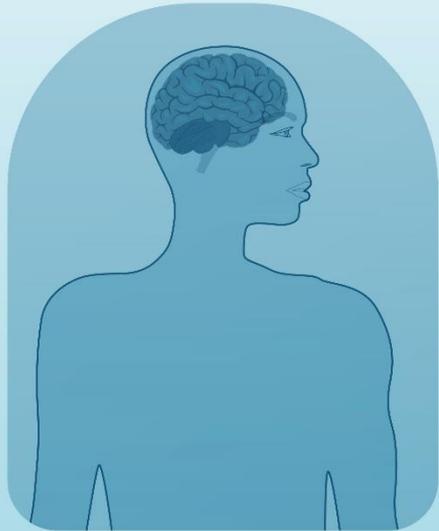
Air pollution is typically worse in busy city areas and near roads than in rural areas.



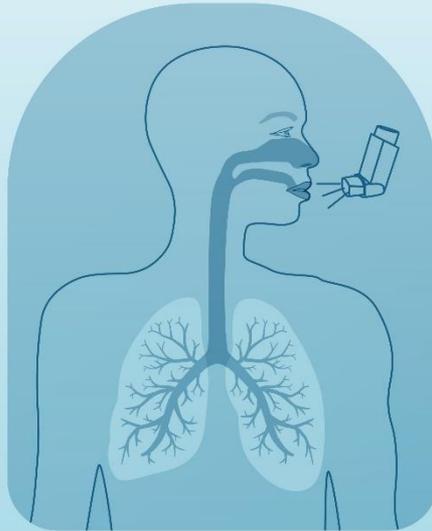
UNIVERSITY OF
BIRMINGHAM

Health burden due to air pollution

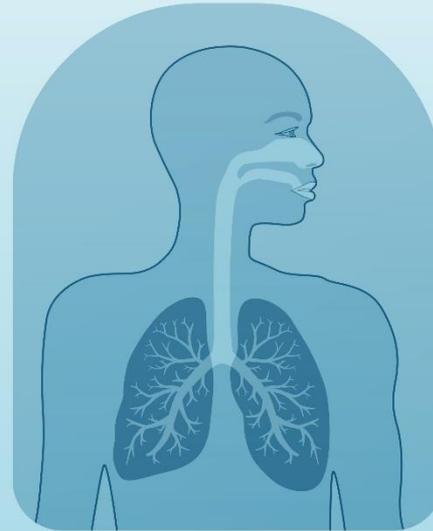
Air pollution causes up to 2,300 early deaths each year in the West Midlands, as well as:



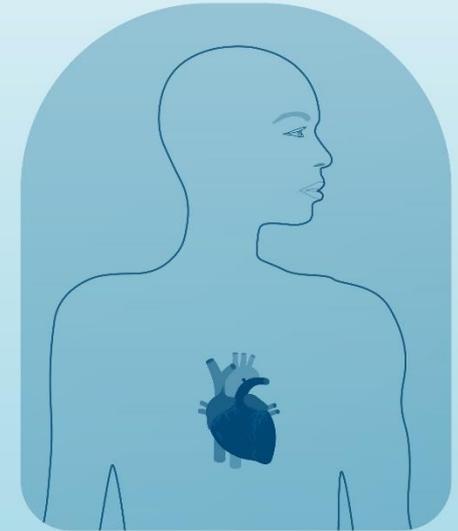
Stroke in up to 1,000 people each year



Asthma in up to 3,300 people each year



Lung cancer in up to 300 people each year



Heart disease in up to 1,400 people each year

AQ-LAT (Air Quality Lifecourse Assessment Tool)

- Free toolkit for health impact assessment & estimating health economic impacts of air pollution
- User guide and bespoke advice and support available
- Available for free download:

<https://wm-air.org.uk/project/health/>

The AQ-LAT User Guide can be viewed here >>

Please send AQ-LAT feedback to: wmair@contacts.bham.ac.uk

AQ-LAT
Air Quality Lifecourse
Assessment Tool
Download

To obtain the AQ-LAT please sign up using this form.

Email address	<input type="text"/>
First name	<input type="text"/>
Last name	<input type="text"/>
Company or organisation	<input type="text"/>
Interest in this briefing note	<input type="checkbox"/>

I agree to WM-Air using my information to



AQ-LAT Dashboard

WM-Air AQ-LAT

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

District	Birmingham
Ward	All Birmingham wards
Time Horizon	10 years
Discount Rate Costs	3.5%
Discount Rate QALYs	1.5%

All Birmingham wards
 PM2.5 annual average concentration at baseline (2021)
 NO2 annual average concentration at baseline (2021)

Step Two: Either customise local air quality targets

PM2.5 Target (µg/m3)	5.00
NO2 Target (µg/m3)	10.00
Target Population (%)	100 %

OR

Pre-selected air pollution scenarios WHO AQG level

*Pre-selected scenarios apply to entire ward
 override with slider if required Conf

Step Three: [Run your calculations](#)

All Birmingham wards

£40,853,000 10 year NHS cost savings

£18,404,000 10 year indirect cost savings*

£20,522,000 10 year Social care cost savings

2405 Deaths prevented over 10 years

13315 QALY gains over 10 years worth(£) £266,305,938

[Return to front page](#)

4620	Asthma cases prevented over	10	years
1361	CHD** cases prevented over	10	years
272	Lung Cancers prevented over	10	years
1113	Strokes prevented over	10	years

Distribution of NHS costs			
£1,058,425	Primary Care costs averted over	10	years
£36,309,052	Secondary Care costs averted over	10	years
£3,461,103	Prescription costs averted over	10	years

2021 Annual Attributable Incident Cases	
Annual Asthma Cases	874
Annual CHD** cases	267
Annual Lung Cancers	60
Annual Strokes	235
Annual mortality	716

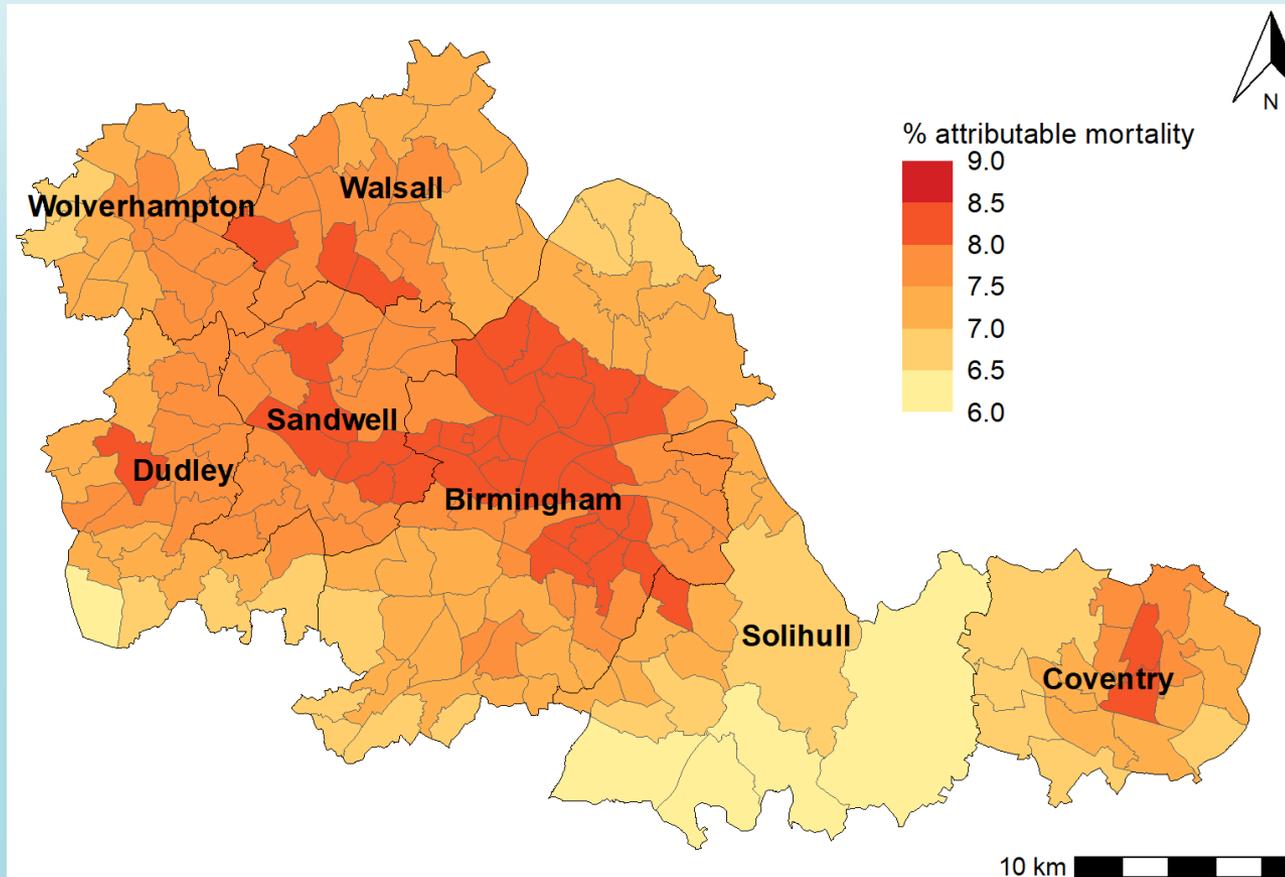
195787	Days off work averted over	10	years
£33,274,000	Discounted NHS cost savings over	10	years
10462	Discounted QALY gains over	10	years

*Indirect costs reflect the time off work owing specifically to death-related absence, does not include productivity and care costs
 **Coronary Heart Disease

AQ-LAT Application

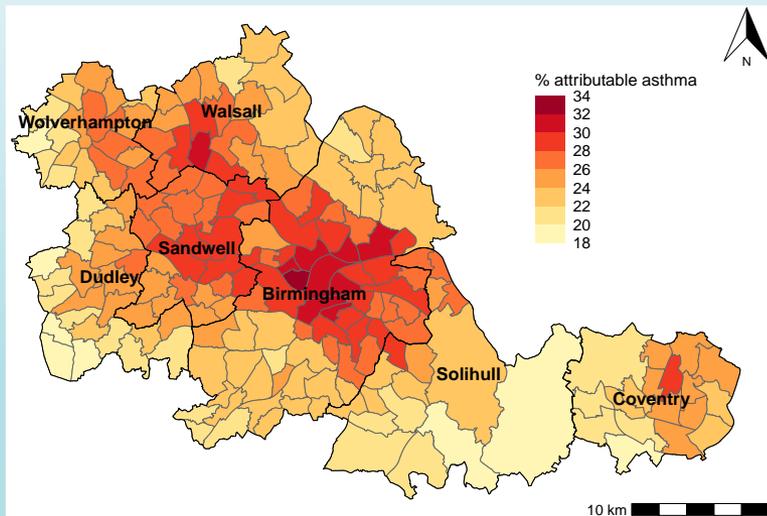
- **Health Impact Assessment:** Estimate ward-level impacts of $PM_{2.5}$ & NO_2 exposure on morbidity (child and adult asthma, coronary heart disease (CHD), stroke, lung cancer) and mortality
- **Scenario/Policy Appraisal:** To assess the health and economic benefits of future scenarios (hypothetical or proposed)
- **Example:** *What would be the health economic benefits of achieving WHO 2021 Global Air Quality Guidelines (annual average concentrations) for NO_2 ($10 \mu g/m^3$) and $PM_{2.5}$ ($5 \mu g/m^3$) in the Birmingham area?*

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

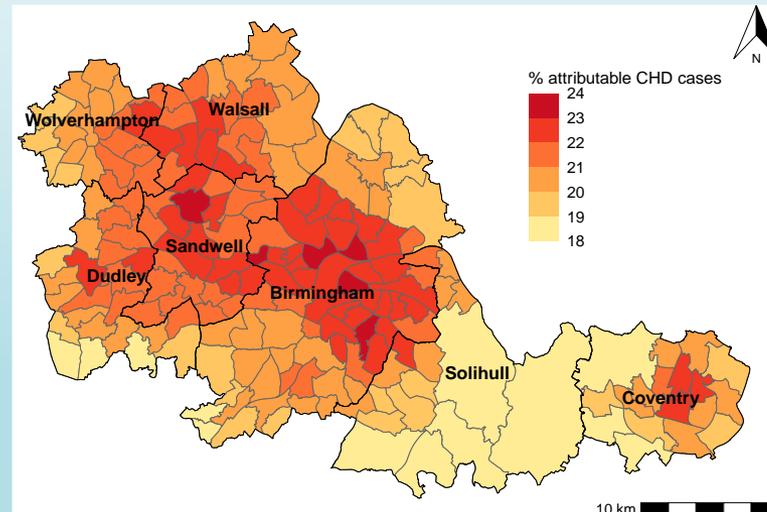


Percentage of disease cases attributable to air pollution at ward level in the WMCA (2019)

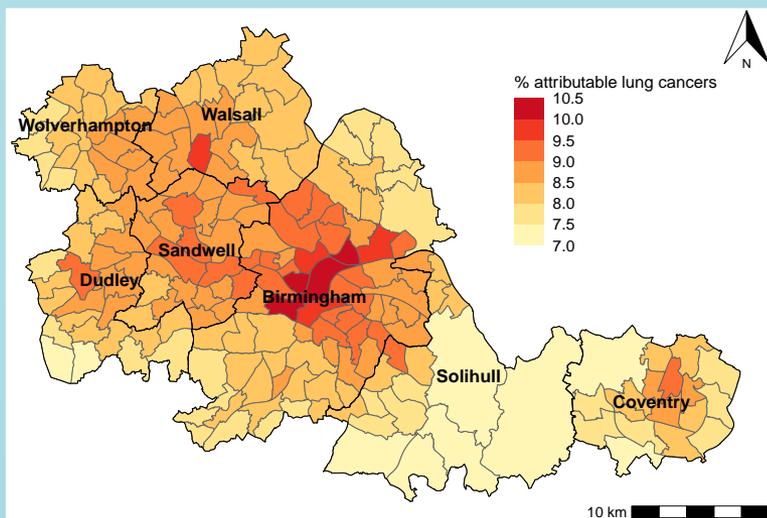
% of Asthma cases attributable to AP



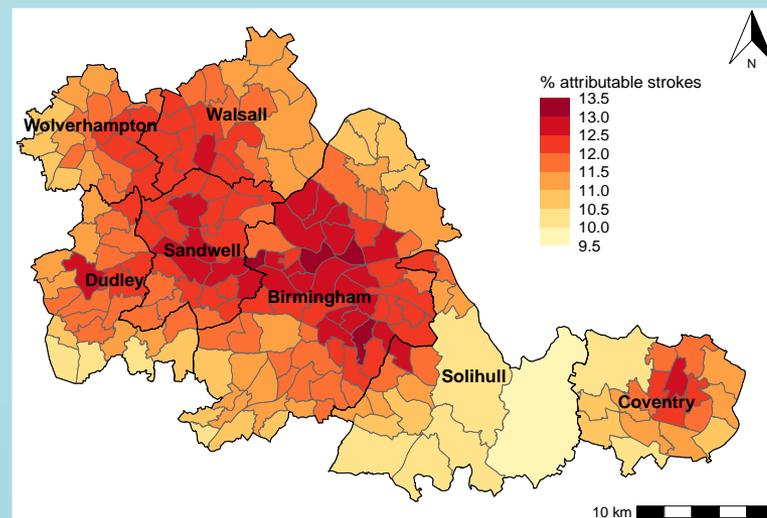
% of CHD cases attributable to AP



% of Lung Cancer cases attributable to AP



% of Stroke cases attributable to AP



Acknowledgements

The WM-Air research team and study partners led by Professor William Bloss

Professor Emma Frew, Health Economics Unit UoB

Dr Pelham Barton, now retired formerly Health Economics Unit UoB

Anita Charlesworth CBE and Dr James Shearer (Health Economics Study Group)

Alex Jones, Air Quality Framework Programme Lead (WMCA)

Karen Exley (UK Health Security Agency)

Steve Dewar (Environmental Protection, Coventry City Council)

CERC (Cambridge Environmental Research Consultants)

All stakeholders and academics who have had input into WM-Air and AQ-LAT development

WM-Air is a Natural Environment Research Council Regional Impact from Science of the Environment

(RISE) initiative. Grant Reference [NE/S003487/1]