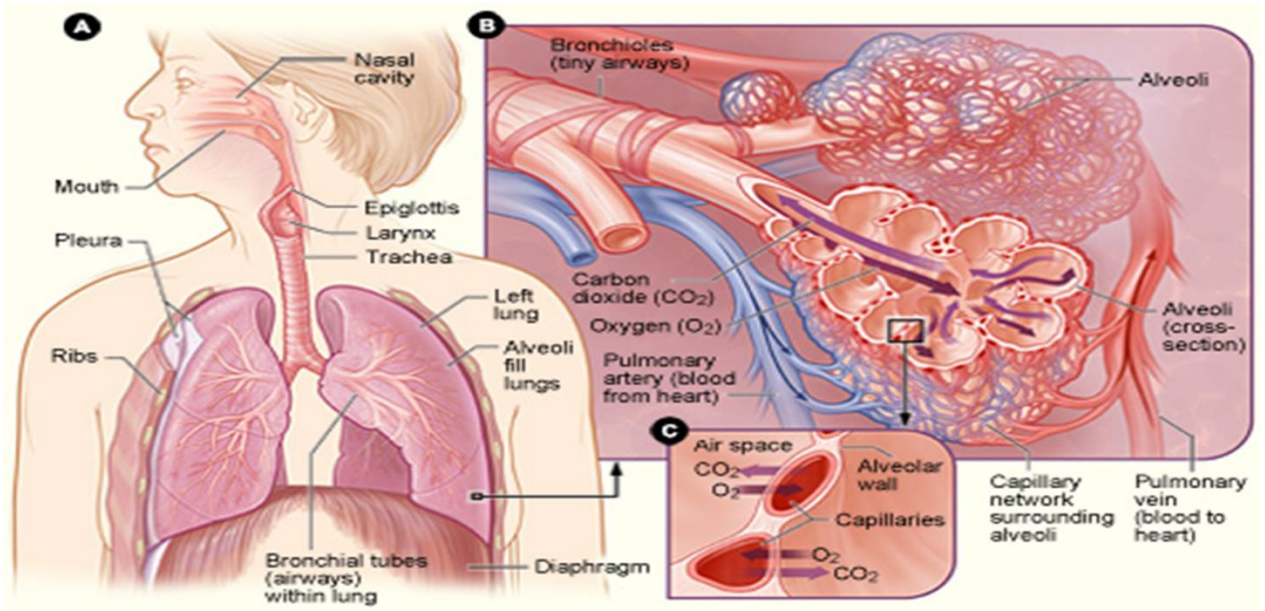
Air Pollution in Colchester

Dr Paul Byrne
Consultant Rheumatologist
First Site 2018

Air Pollution in Colchester

- Introduction
- Air Pollution is Changing
- The Proof Of Harm
- Air Monitoring
- Air Pollution in Colchester
- The Solutions


A
Nasal cavity
Mouth
Epiglottis
Larynx
Trachea
Pleura
Left lung
Alveoli fill lungs
Ribs
Bronchial tubes (airways) within lung
Diaphragm
B
Bronchioles (tiny airways)
Alveoli
Carbon dioxide (CO_2)
Oxygen (O_2)
Alveoli (cross-section)
Pulmonary artery (blood from heart)
C
Air space
CO_2
O_2
Alveolar wall
Capillaries
O_2
CO_2
Capillary network surrounding alveoli
Pulmonary vein (blood to heart)

London Evening Standard

Friday 5 June 2015 | FREE | standard.co.uk

AS POLLUTION BLACKSPOTS IN THE SQUARE MILE ARE NAMED, CHIEFS WARN:

AIR TOO TOXIC TO JOG IN CITY

Nicholas Cecil

CITY chiefs today issued an unprecedented warning to joggers to avoid pollution blackspots in the Square Mile.

They warned Londoners to avoid Upper Thames Street into Lower Thames Street, Bank Junction, Bishopsgate into Gracechurch Street and Farringdon Street into New Bridge Street on high pollution days. Jon Averns, the City of London Corporation's public protection director, told The Standard: "During very bad pollution episodes, even a normally fit and healthy person can experience issues.

"Strenuous exercise means deeper breathing and more particles inhaled into the lungs, so we are calling on

Continued on Page 4

Clean London

A London Standard Special Report

EXPRESS

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Home > News > Health > Air pollution now leading cause of lung cancer

Air pollution now leading cause of lung cancer

AIR pollution has been named as the leading cause of lung cancer, the World Health Organisation's cancer agency said.

By: Tom Rawle
Published: Thu, October 17, 2013

9 Comments | Like 139 | Tweet 22 | +1 6


SURFERS
AGAINST SEWAGE

Cigarette smoke

Smoker's lungs

Particulate matter

Atmospheric particulates

Air pollution is 24/7 passive smoking for the entire population

30,000 early deaths across the UK per annum attributable to air pollution.
(Average 8 month loss of life for <u>every</u> person
Especially lung disease and stroke

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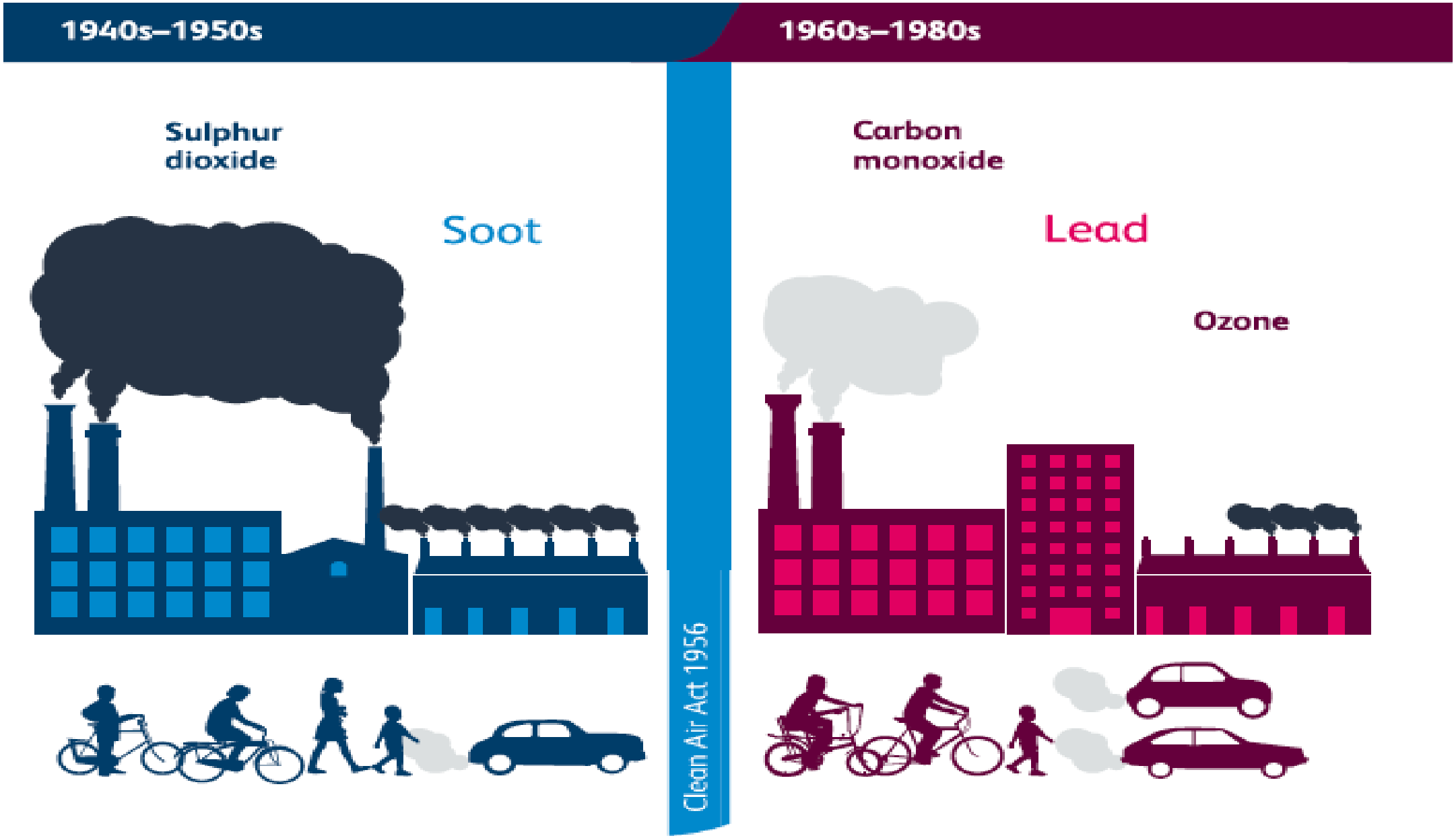
Air pollution is changing

Air Pollution then



Air pollution now

1980s–2000s

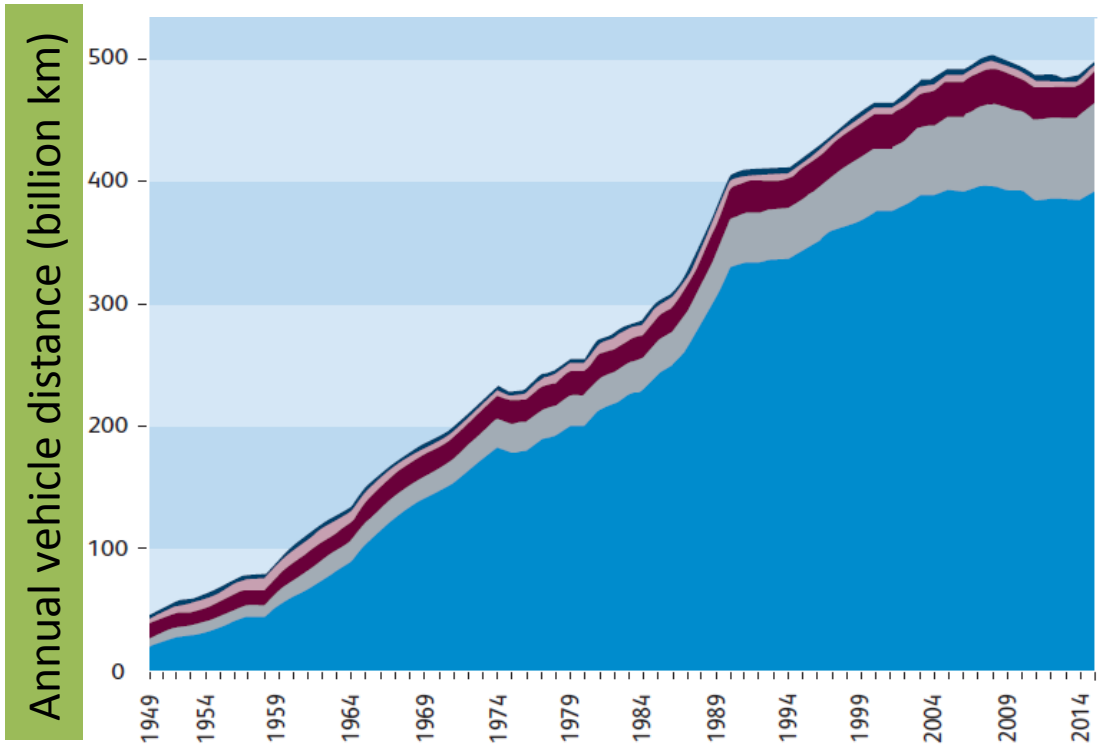
Acr

Nitrogen dioxide

Particulates

Lead in fuel restricted 1998

Annual distance travelled by road in the UK



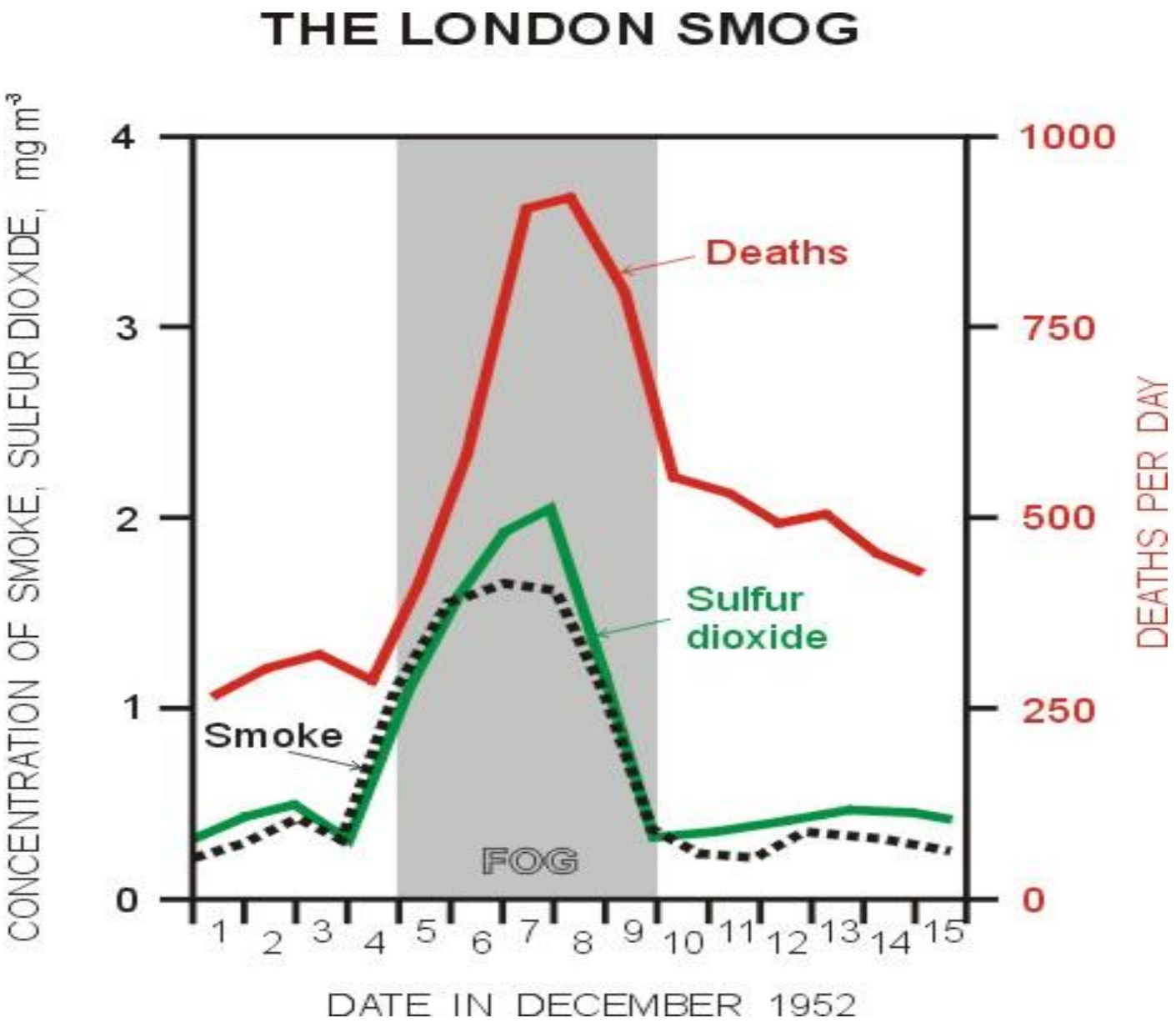
Now, 774,513 diesel cars in London

170,000 (30%) increase since 2012

- In 2016, road traffic in the UK was 12x higher than in 1949

The Clean Air Acts, 1956 & 1968

- This Act aimed to control domestic sources of smoke pollution by introducing smokeless zones.
  - domestic emissions reduced because of smoke control areas;
  - electricity and gas usage increased and the use of solid fuels decreased;
  - cleaner coals were burnt which had a lower sulphur content;
  - use of tall chimney stacks on power stations;
  - relocation of power stations to more rural areas;
  - continuing decline in heavy industry.



- December 1952
- Smog for 5 days
- Killed 12000
- Led to 1956 clean air act

THE TIMES

Friday July 7th 2017

France announces ban on petrol and diesel within generation

Graeme Paton Transport Correspondent
Charles Bremner, Emily Gosden

Britain has come under pressure to phase out diesel and petrol cars after the French announced plans yesterday for an all-out ban.

The sale of vehicles that use an internal combustion engine will be outlawed in France from 2040 as part of a shift towards electric cars. Under proposals outlined by President Macron, France aims to become carbon-neutral by 2050. Diesel and petrol vehicles make up about 95 per cent of new cars on its roads at present.

The move forms part of an ambitious plan to meet targets under the Paris climate agreement, weeks after President Trump revealed that the United States would pull out of the 2016 deal. France is the first state in Europe to announce a deadline after which all cars must be electric.

Norway, which has the highest proportion of electric vehicles in the world, will permit only sales of hybrid and all-electric cars from 2025. India, whose cities are among the most polluted in the world, has set a target of 2030 for all-electric car sales. The French announcement followed Volvo's declaration that it would abandon the production of diesel and petrol-only vehicles. By 2019, all new models will be pure electric or hybrid.

Experts and campaigners called on the government to copy the French amid concerns over air pollution.

Steve Gooding, director of the RAC Foundation and former director-general of roads at the Department for Transport, said motorists needed more certainty. "The importance of this news is not what it says but the certainty it provides and deadline it sets for carmakers and consumers to react," he said. "The life span of a car in the UK is around 14 years so any fundamental

Continued on page 4, col 4

Short drives around town are the dirtiest

Ben Webster Environment Editor

Drivers who make short car journeys are causing the highest levels of air pollution because exhaust clean-up systems do not work properly on cold engines, a study has found.

It takes more than five minutes for the systems, such as selective catalytic reduction, to reach the temperature at which they effectively remove nitrogen oxides (NOx) from exhaust gases, according to Emissions Analytics, an independent testing company.

With many car journeys lasting last less than five minutes, millions of trips a day are made in cars in which pollution controls are not working properly for the entire journey.

Emissions Analytics used portable measuring equipment to test the amount of NOx produced by more than 150 new cars on the road. It tested them after one minute, five minutes and when the system was fully warm.

It found that NOx emissions were 32 per cent higher on diesel cars after one minute than when the system had reached its optimum operating temperature. Even after five minutes, they were 13 per cent higher.

The difference was much greater for petrol cars, with NOx emissions 422 per cent higher after one minute than when the system was fully warm. However, petrol cars typically produce less than a tenth of the NOx of diesel cars.

Nick Molden, founder of Emissions Analytics, said that the high pollution from cold engines was a particular problem in cities, where most cars were used for short journeys.

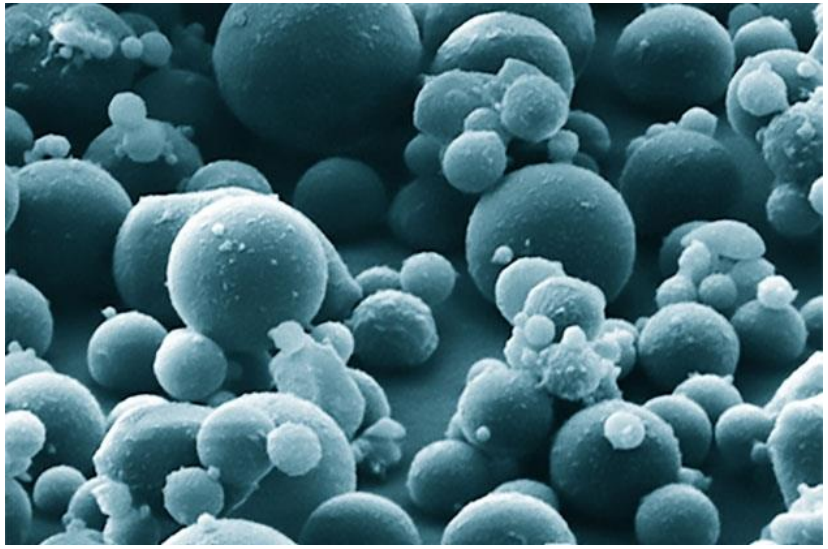
He said that fuel-saving systems that cut the engine automatically when the car was stationary were creating a hidden pollution problem because the NOx removal system might never reach its operating temperature.

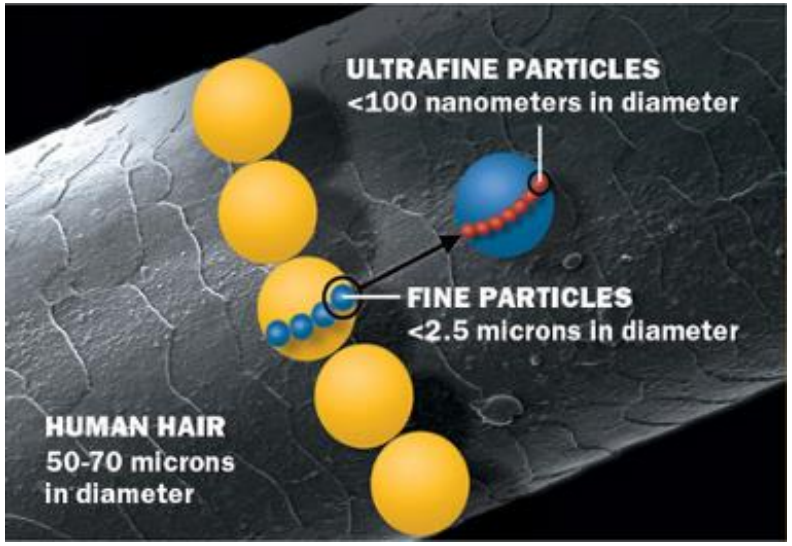
The California Air Resources Board (CARB) & the ZEV program

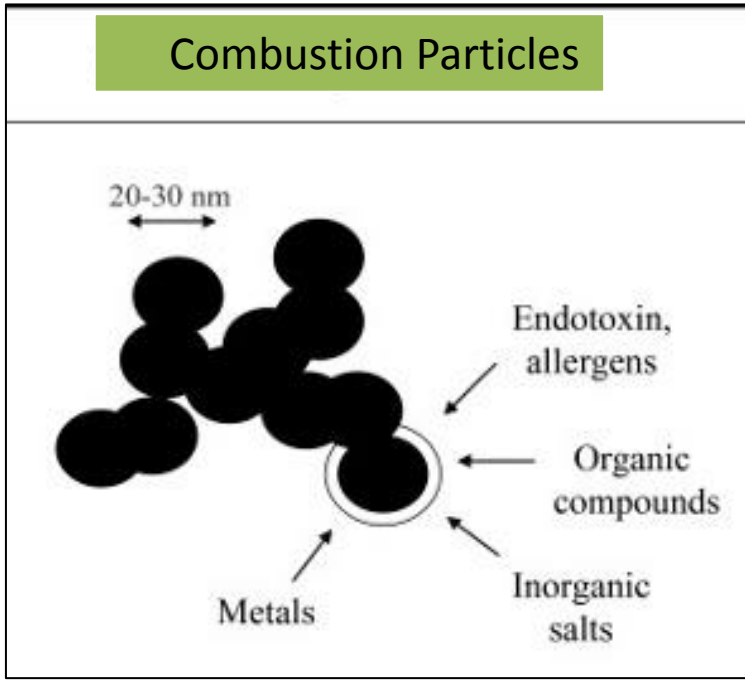
- The Zero Emission Vehicle (ZEV) program is a California state regulation that requires automakers to sell electric cars and trucks in California and 9 other states. (Connecticut, Maine, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, and Vermont). The exact number of vehicles is linked to the automaker's overall sales within the state.
- Under the ZEV regulation, three distinct vehicle designs are considered "zero emission," though to varying degrees.
- Plug-in hybrid , Battery electric, Hydrogen fuel cell vehicles
- The program's objective is to ensure that automakers research, develop, and market electric vehicles (EVs),
- By directly requiring that automakers invest in clean technology, the ZEV program is considered one of the nation's most forward-looking climate policies, and a driving force behind an expanding market with a current offer of over 30 zero emission models available to the U.S. public.

Sources and types of outdoor air polluti

The major challenge: modern air pollution is odourless, tasteless and invisible

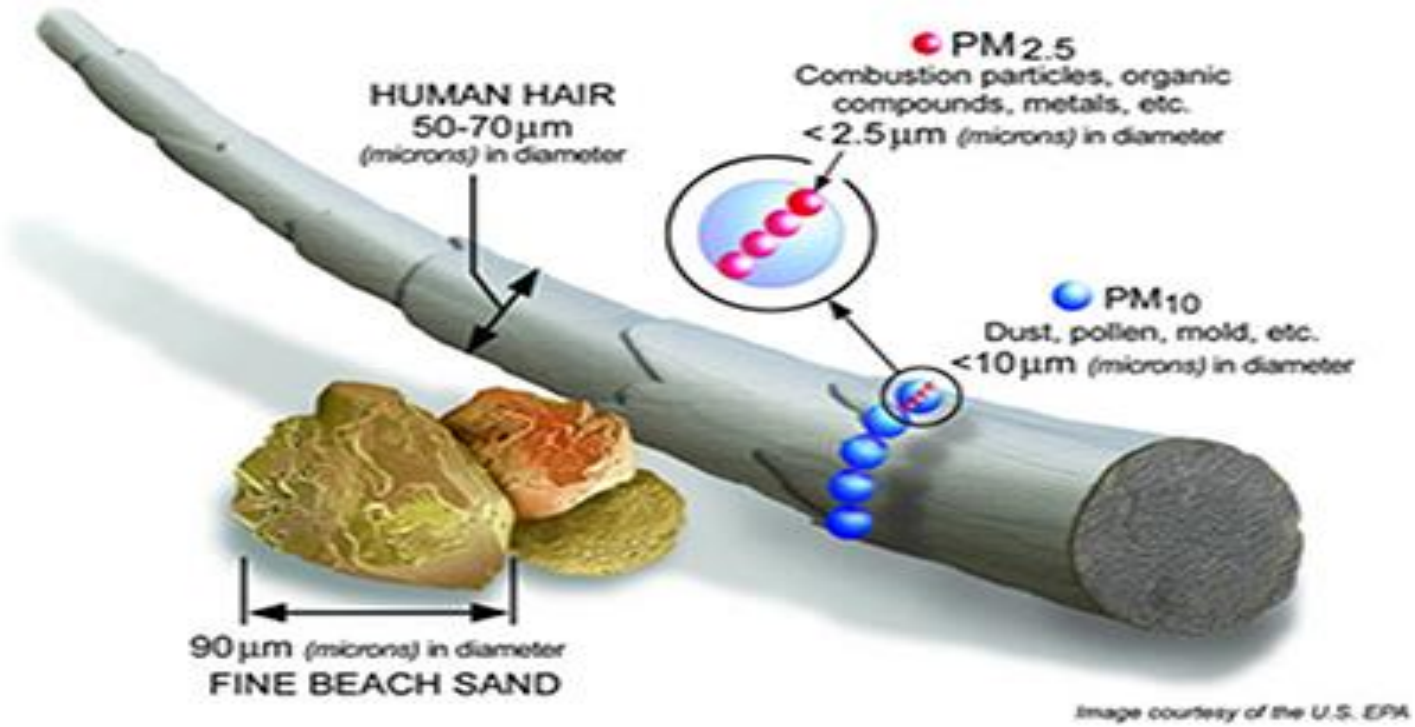




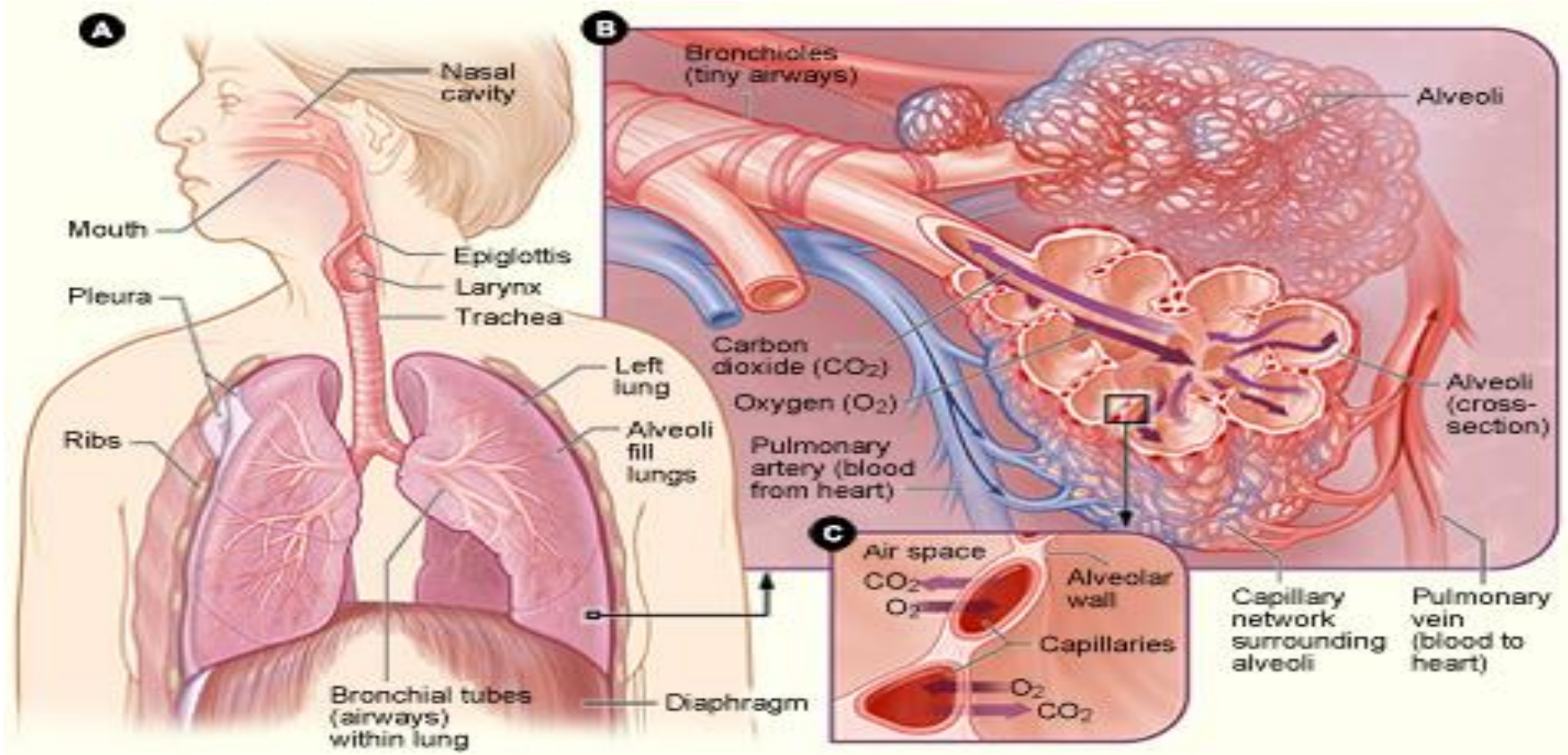


The Perfect Poison!

Particulates $PM_{2.5}$



The lungs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Alveoli (cross-section)
Pulmonary artery (blood from heart)
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Capillary network surrounding alveoli
Pulmonary vein (blood to heart)

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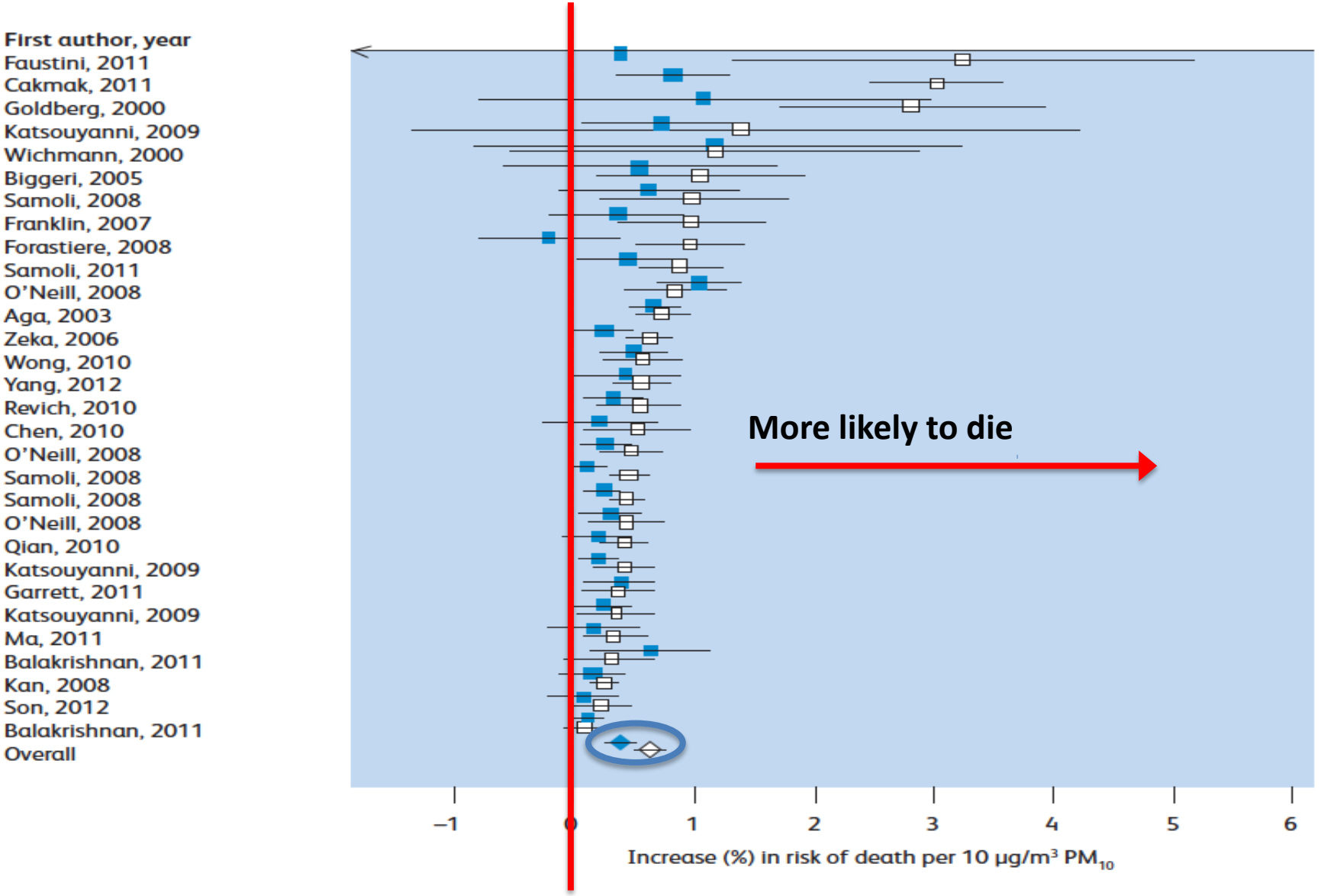
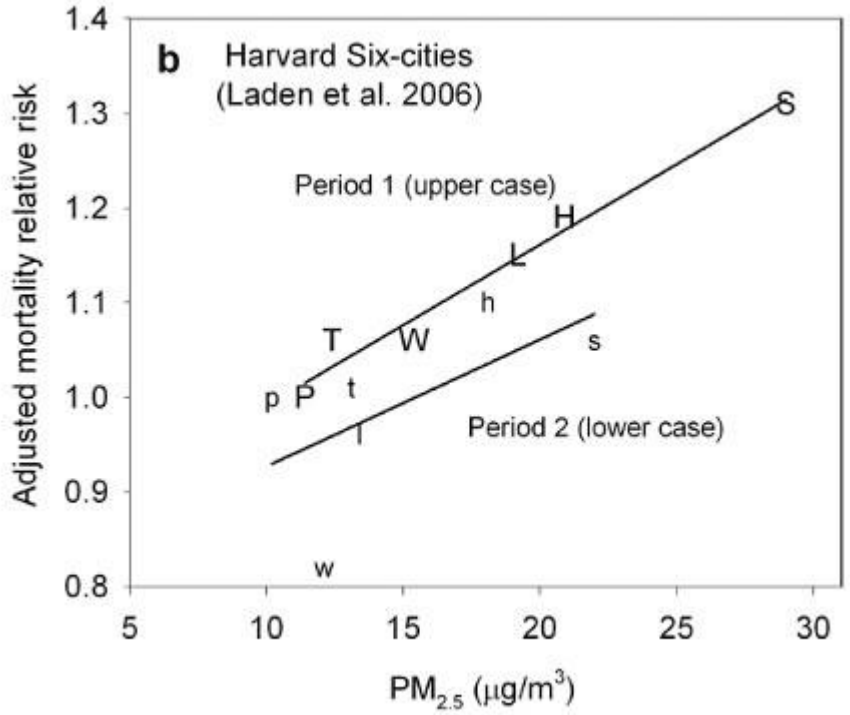
Hayfever

- Pollen coated hydrocarbons

Risk of death and exposure to PM_{10}



1993 NEJM six cities



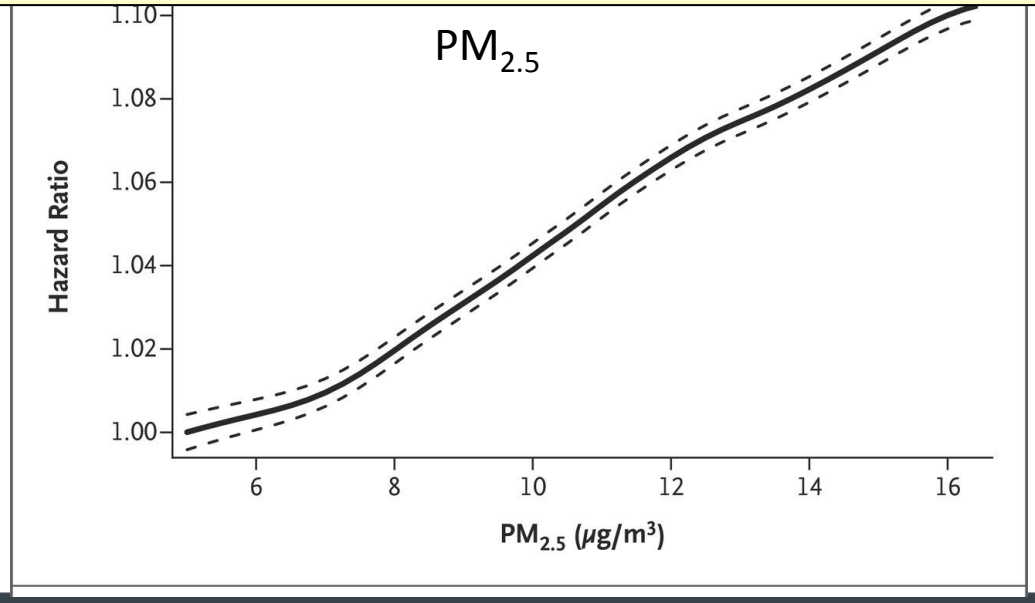
Inhalation of particulate matters (PMs) in the atmosphere can directly or indirectly lead to or deteriorate various symptoms/diseases. They include asthma, hay fever, increased respiratory symptoms, pulmonary inflammation, reduced lung function, and cardiovascular diseases. Recent evidence suggests that small PMs may be related to increased lung cancer risk. It is also suggested that long-term exposures to PMs have larger and more persistent cumulative effects than short-term exposures.

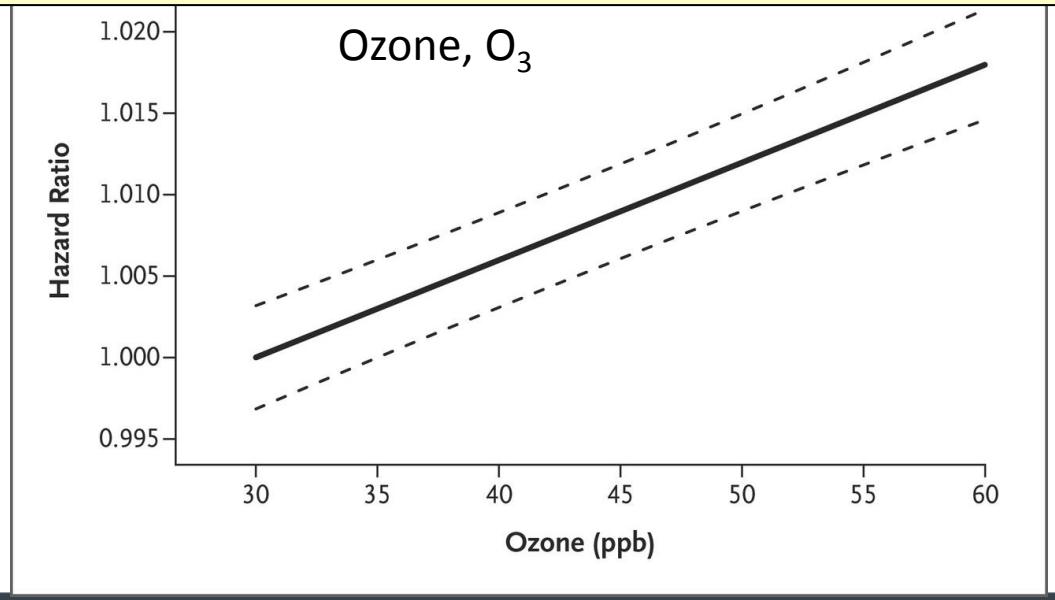
The following graph shows that increased PM concentrations in the atmosphere are associated with an increased mortality.

Air Pollution and Mortality in the Medicare Population

Di Q, et al. N Engl J Med. 2017 Jun 29; 376(26): 2513-22

- In the entire Medicare population, there was significant evidence of adverse effects related to exposure to $PM_{2.5}$ and ozone at concentrations below current national standards.
- This effect was most pronounced among self-identified racial minorities and people with low income.





J Abnorm Child Psychol
https://doi.org/10.1007/s10802-017-0367-5

Longitudinal Analysis of Particulate Air Pollutants and Adolescent Delinquent Behavior in Southern California

Diana Younan[1] &Catherine Tuvblad[2,3] &Meredith Franklin[1] &Fred Lurmann[4] &
Lianfa Li[1] &Jun Wu[5] &Kiros Berhane[1] &Laura A. Baker[2] &Jiu-Chiuan Chen[1]

Long-term $PM_{2.5}$ exposure may increase delinquent behavior of urban-dwelling adolescents, with the resulting neurotoxic effect aggravated by psychosocial adversities.

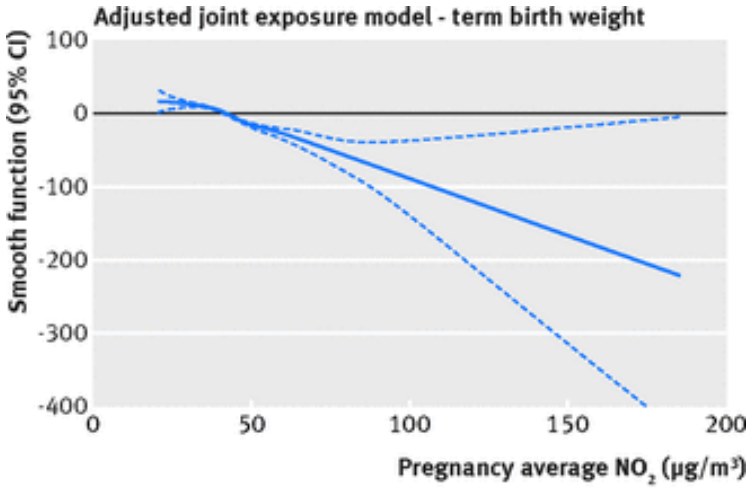
Antisocial Behavior Study conducted.

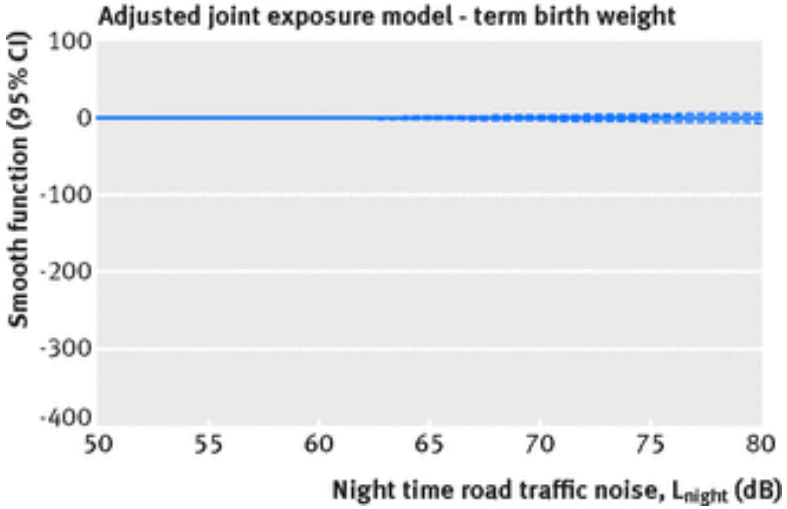
- The results show that $PM_{2.5}$ exposure at baseline and cumulative exposure during follow-up was significantly associated ($p < 0.05$) with increased delinquent behavior.
- The estimated effect sizes (per interquartile increase of $PM_{2.5}$ by 3.12-5.18 μg/m^3) were equivalent to the difference in delinquency scores between adolescents who are 3.5–4 years apart in age.
- The adverse effect was stronger in families with unfavorable parent-to-child relationships, increased parental stress or maternal depressive symptoms.

Impact of London's road traffic air and noise pollution on birth weight: retrospective population based cohort study.

Smith R et al. BMJ 2017;359:j5299.

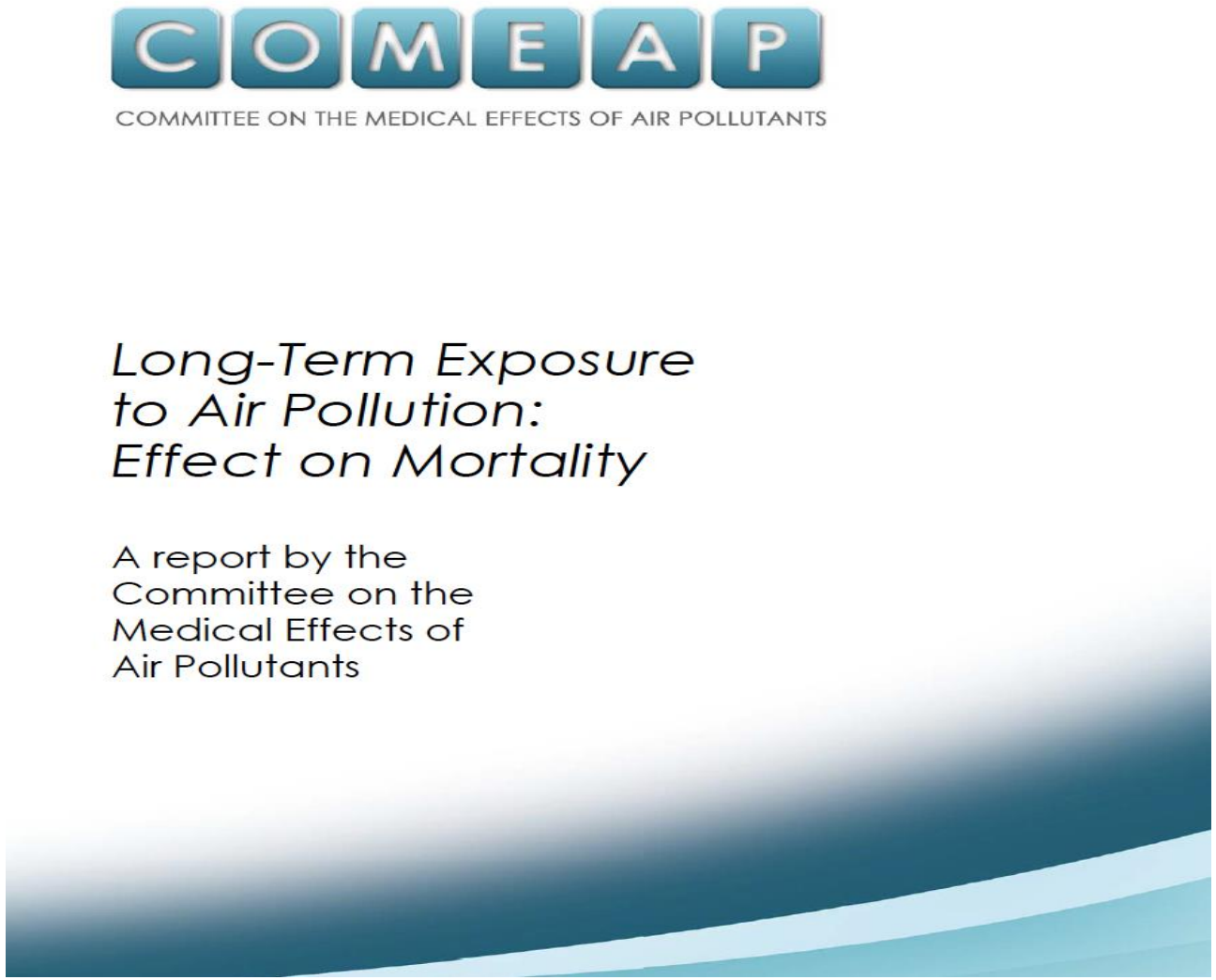
Greater London and surrounding counties up to the M25 motorway (2317 km2), UK, from 2006 to 2010. Participants 540 365 singleton term live births





This study suggests that in Greater London, which has 19% of all annual births in England and Wales, air pollution from road traffic is having a detrimental impact upon babies' health, before they are born. We estimate that 3% of term LBW cases in London are directly attributable to residential exposure during pregnancy to $PM_{2.5}$>13.8 µg/m^3

Air Pollution and Mortality



"The evidence base regarding the effects of long term exposure to air pollutants has strengthened since our 2001 report."

*"We are left with **little doubt** that long term exposure to air pollutants has an **effect on mortality** and thus **decreases life expectancy**."*

29,000 deaths

Committee on the Medical Effects of Air Pollutants. *Long term exposure to air pollution: effect on mortality*. London: Health Protection Agency, 2009. www.gov.uk/government/uploads/system/ uploads/attachment_data/file/304667/ COMEAP_long_term_exposure_to_air_pollution.pdf [Accessed 2 December 2015].

The Lancet Commission on pollution and health.

Landrigan PJ + 26 other authors. Lancet. 2017 Oct 19. pii: S0140-6736(17)32345-0.

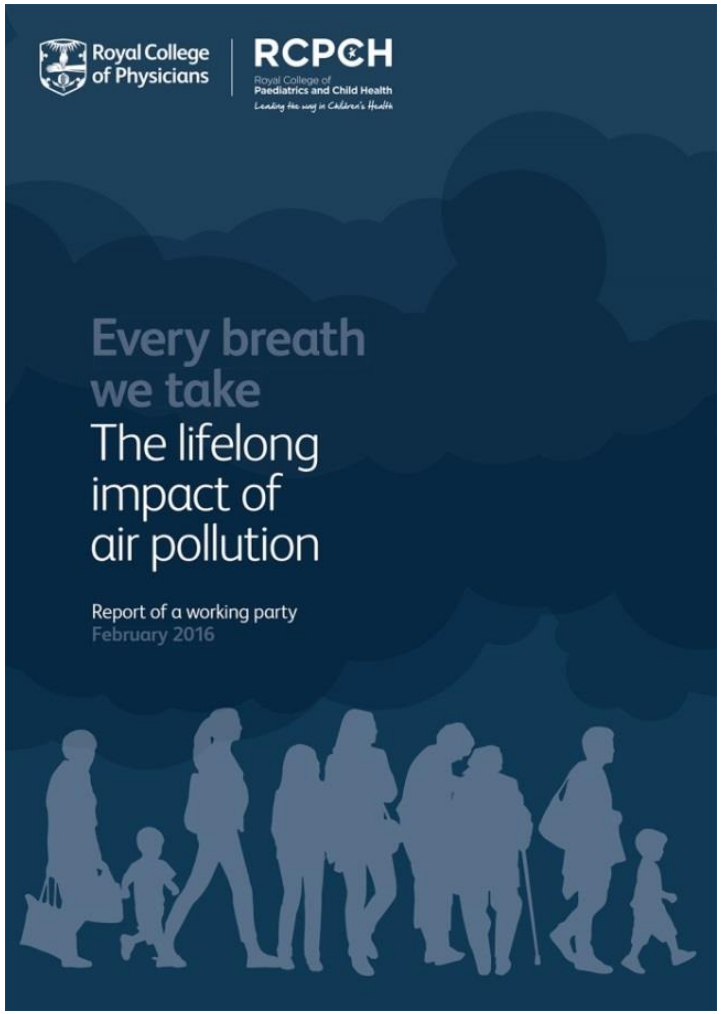
The *Lancet* Commission on pollution and health

Philip J Landrigan, Richard Fuller, Nereus J R Acosta, Olusoji Adeyi, Robert Arnold, Niladri (Nil) Basu, Abdoulaye Bibi Baldé, Roberto Bertollini, Stephan Bose-O'Reilly, Jo Ivey Boufford, Patrick N Breysse, Thomas Chiles, Chulabhorn Mahidol, Awa M Coll-Seck, Maureen L Cropper, Julius Fobil, Valentin Fuster, Michael Greenstone, Andy Haines, David Hanrahan, David Hunter, Mukesh Khare, Alan Krupnick, Bruce Lanphear, Bindu Lohani, Keith Martin, Karen V Mathiasen, Maureen A McTeer, Christopher J L Murray, Johanita D Ndahimananjara, Frederica Perera, Janez Potočnik, Alexander S Preker, Jairam Ramesh, Johan Rockström, Carlos Salinas, Leona D Samson, Karti Sandilya, Peter D Sly, Kirk R Smith, Achim Steiner, Richard B Stewart, William A Suk, Onno C P van Schayck, Gautam N Yadama, Kandeh Yumkella, Ma Zhong

Executive summary

Pollution is the largest environmental cause of disease and premature death in the world today. Diseases caused by pollution were responsible for an estimated 9 million premature deaths in 2015—16% of all deaths worldwide—three times more deaths than from AIDS, tuberculosis, and malaria combined and 15 times more than from all wars and other forms of violence. In the most severely affected countries, pollution-related disease is responsible for more than one death in four.

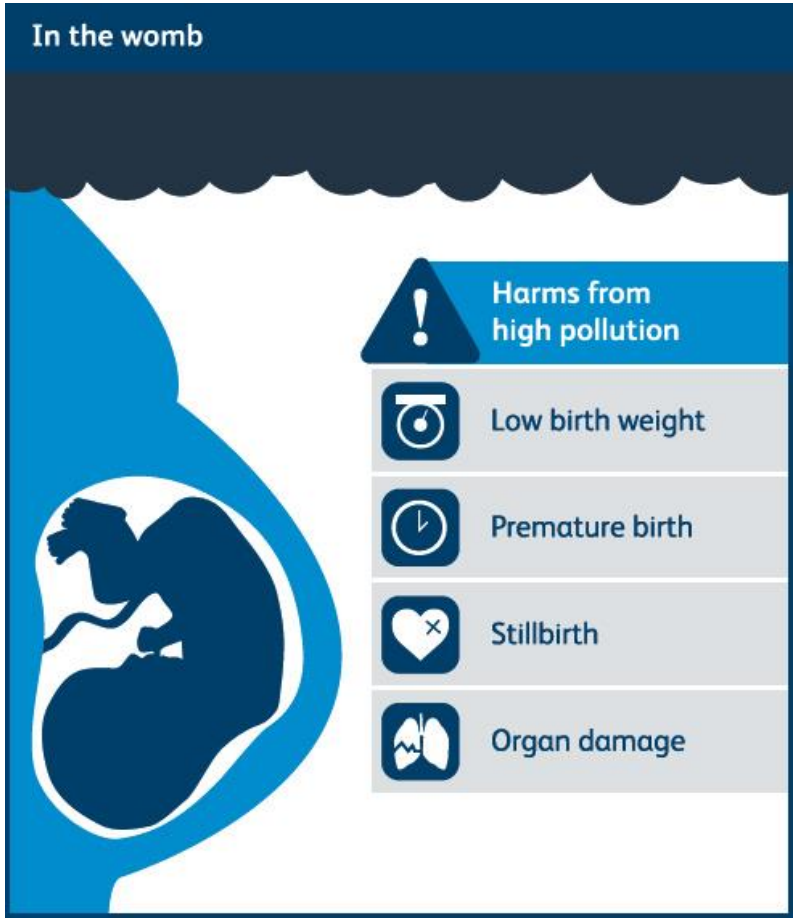
Pollution endangers planetary health, destroys ecosystems, and is intimately linked to global climate change. Fuel combustion—fossil fuel combustion in high-income and middle-income countries and burning of biomass in low-income countries—accounts for 85% of airborne particulate pollution and for almost all pollution by oxides of sulphur and nitrogen. Fuel combustion is also a major source of the greenhouse gases and short-lived climate pollutants that drive climate change. Key emitters of carbon dioxide, such as electricity-generating plants,



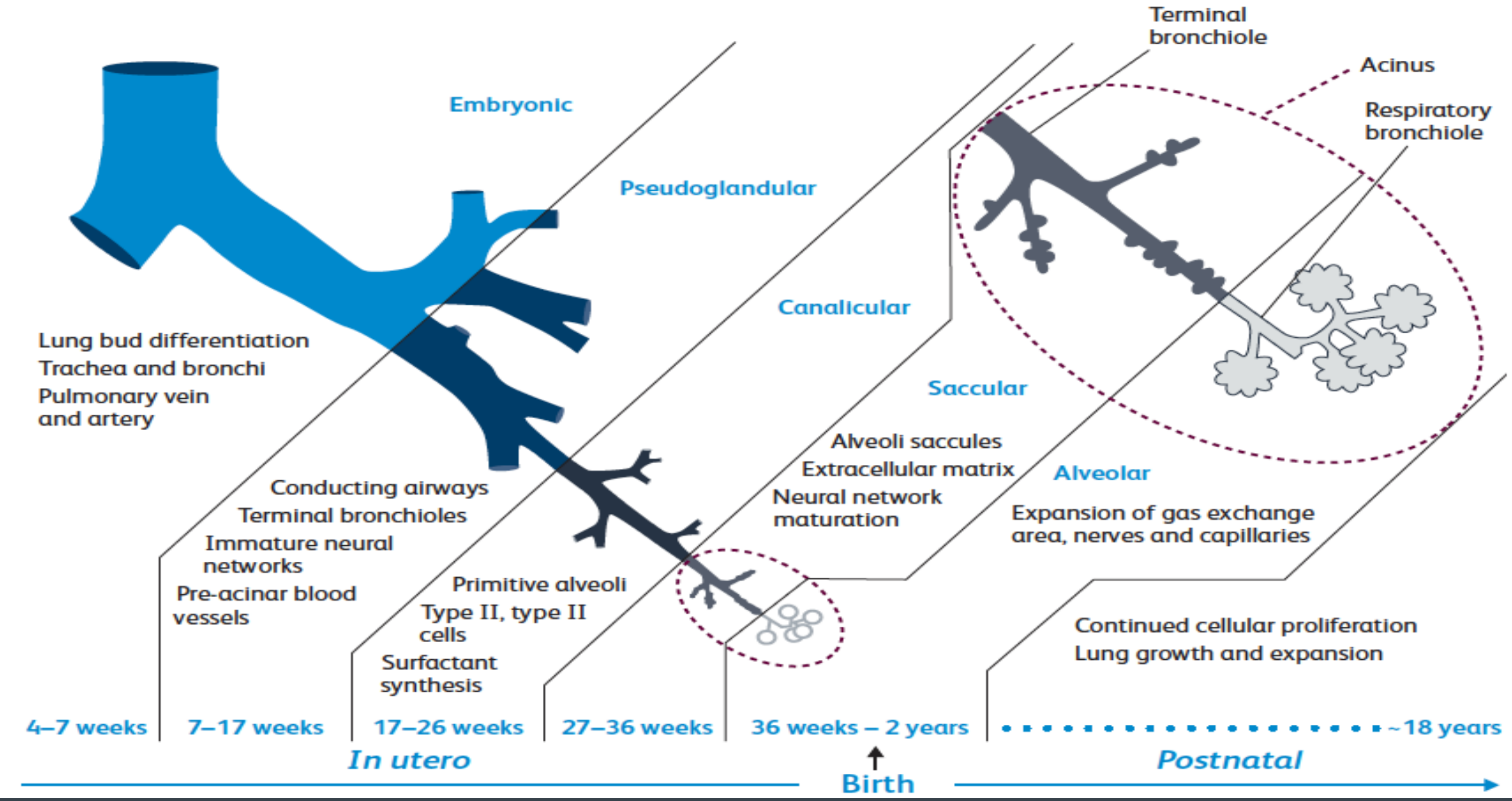
- Air pollution (PM and NO_2) estimated to cause around 40,000 deaths per year in the UK
- Estimated cost of air pollution is £20bn annually in the UK
- Linked to major health challenges of our day such as heart disease, asthma, COPD, lung cancer, diabetes and dementia

February 23rd 2016

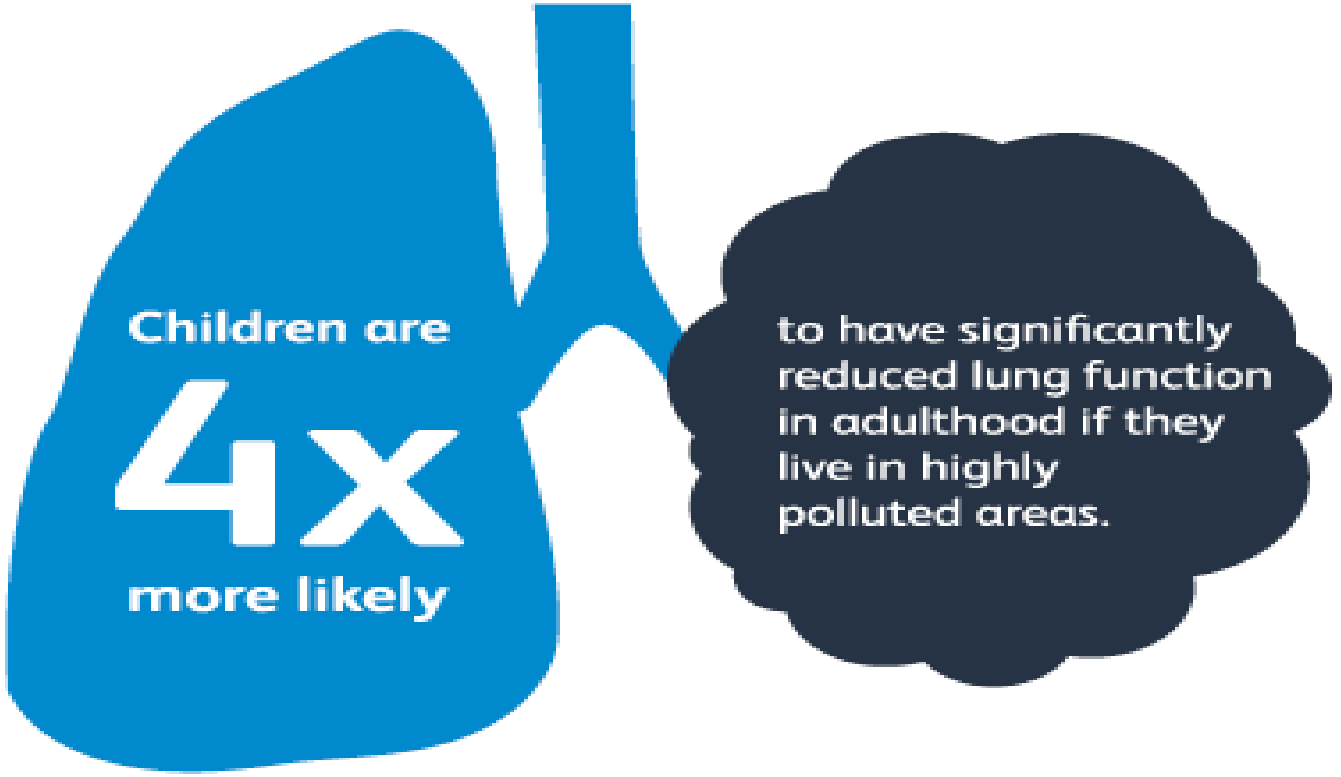
Protecting future generations



- First report to examine health implications of exposure to air pollution over lifetime
- Developing heart, lung, brain, hormone systems and immunity can all be harmed by pollution
- Effects growth, intelligence, asthma and development of the brain and coordination


Terminal bronchiole
Acinus
Respiratory bronchiole
Embryonic
Pseudoglandular
Canalicular
Saccular
Alveolar
Lung bud differentiation
Trachea and bronchi
Pulmonary vein and artery
Conducting airways
Terminal bronchioles
Immature neural networks
Pre-acinar blood vessels
Primitive alveoli
Type II, type II cells
Surfactant synthesis
Alveoli saccules
Extracellular matrix
Neural network maturation
Expansion of gas exchange area, nerves and capillaries
Continued cellular proliferation
Lung growth and expansion
4–7 weeks
7–17 weeks
17–26 weeks
27–36 weeks
36 weeks – 2 years
~18 years
In utero
Birth
Postnatal

Risks to children




GREENPEACE

In the womb

Baby

Outdoor pollution: vehicle exhaust, industrial emissions

Harms from high pollution

- Low birth weight
- Premature birth
- Stillbirth
- Organ damage

*Includes exhaust gases from cooking, heating and burning solid fuels, use of household cleaners and other chemicals, VOCs, etc

Alveolar macrophages

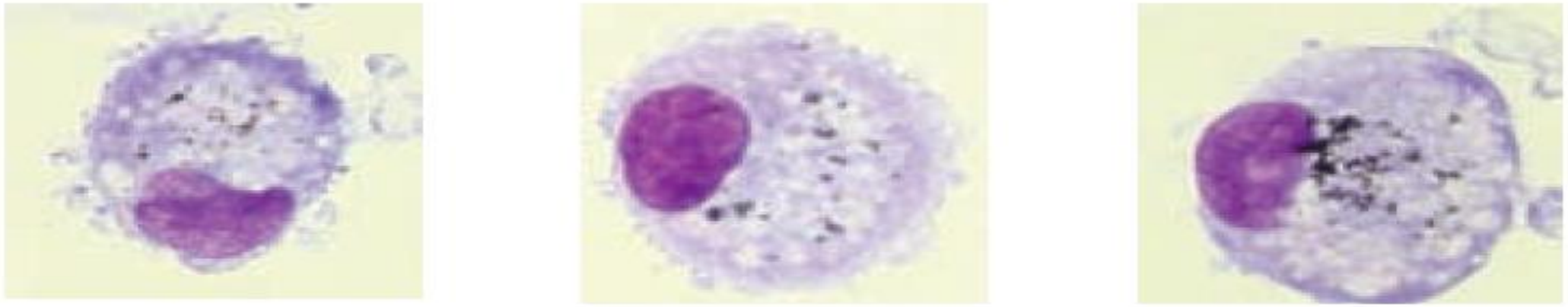
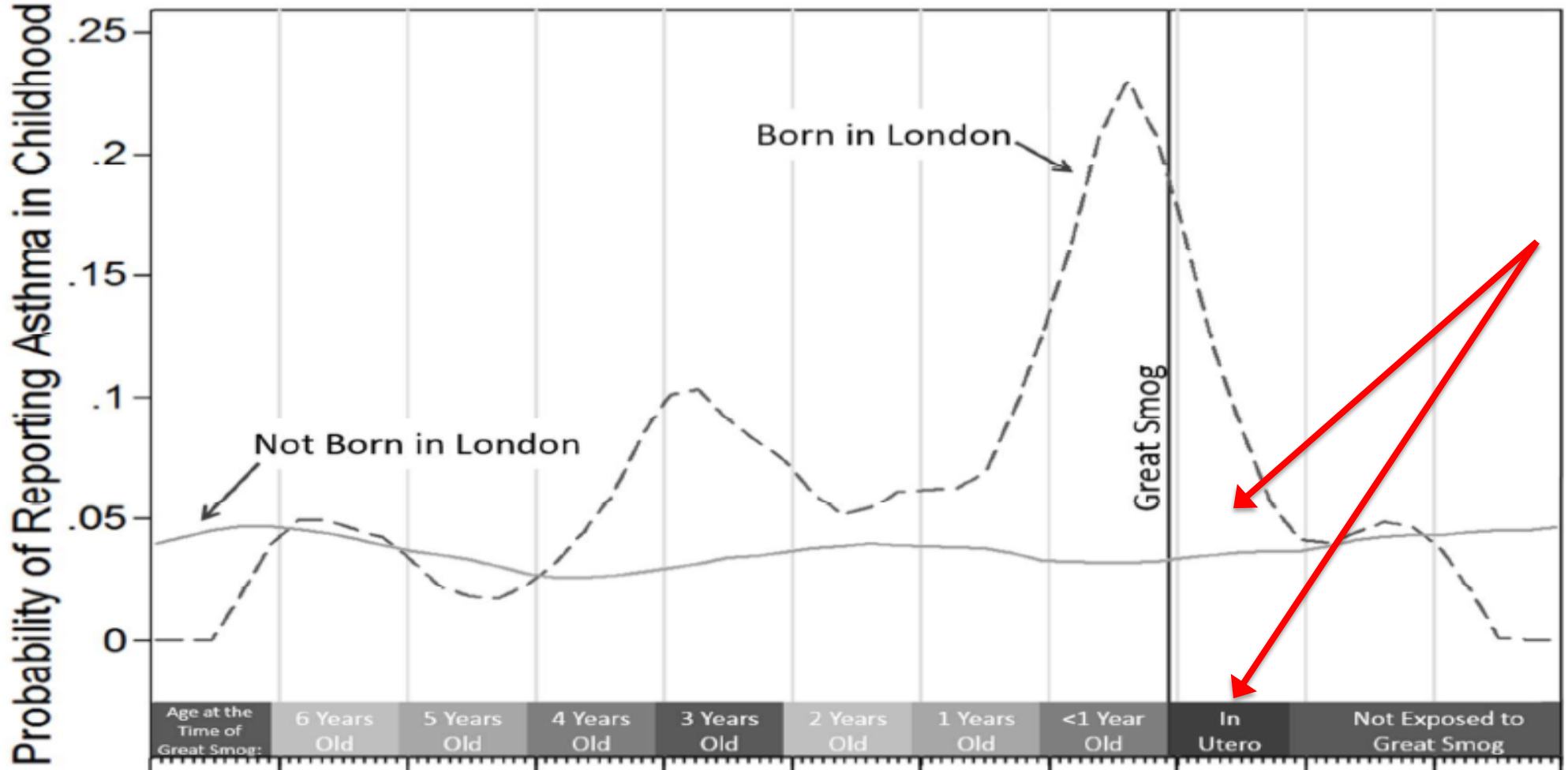


Fig 12. Examples of macrophages recovered from the lower airways of healthy children living in Leicester. The black spots in some of the cells are inhaled fossil fuel-derived particles.

More direct evidence that air pollution causes suppression of lung function growth is provided by a cross-sectional study of healthy schoolchildren in Leicester, UK.[7] This study used the capacity of macrophages resident on the mucosal surface of the lower airways to take up inhaled material, including pollution particles (PM) (Fig 12).

Figure 1: Asthma in childhood by date and location of birth.



Date of Birth	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	Total
Born in London	31	56	52	39	38	34	38	15	42	37	36	418
Born Elsewhere	194	246	256	267	211	229	228	129	221	268	249	2,498
Total	225	302	308	306	249	263	266	144	263	305	285	2,916

Notes: Plots report smoothed rates of childhood asthma by month of birth separately for those born inside and outside of London. Smoothing uses local polynomial regressions with Epanechnikov kernel-weights.

Vaz, chairman of the Commons home

the guise of commercial sensitivity.

9/7/2016

Asthmatics still suffering from 1952 smog

Spencer Hazel

London's great smog of 1952 is still taking a toll on the health of people today — including some who were not born at the time.

The smog resulted in about 4,000 deaths across the city and damaged the health of thousands more people. Pollution during four days in December was up to 23 times as severe as current regulations and guidelines would allow.

American researchers suggests that health effects may still be felt, even in those who were exposed to the pollution while in the womb. Reporting in the *American Journal of Respiratory and Critical Care Medicine*, they set out to discover what effect air pollution had on people who were exposed to it in the womb or the first year of their lives.

Their study drew on the English Longitudinal Study on Ageing project, looking at almost 3,000 cases of people born between 1945 and 1955 and comparing people who were exposed to the smog with those who were not. They found increased rates of asthma in the former. People who were infants in London at the time showed a 20 per cent rise in the likelihood of developing asthma. Those in the womb at the time had a 9.5 per cent increase.

The authors suggest that external stimuli such as air pollution may affect foetal programming, for example influencing the cells that regulate chronic asthma. The findings have implications for cities such as Delhi, Karachi, and Beijing, which recently experienced the highest recorded levels of air pollution.

"Our results suggest that the harm from this dreadful event over 60 years ago lives on today," wrote Dr Matthew Neidell, associate professor at Columbia University's Mailman School of Public Health. "It also suggest that very young children living in heavily polluted environments, such as Beijing, are likely to experience significant changes in health."

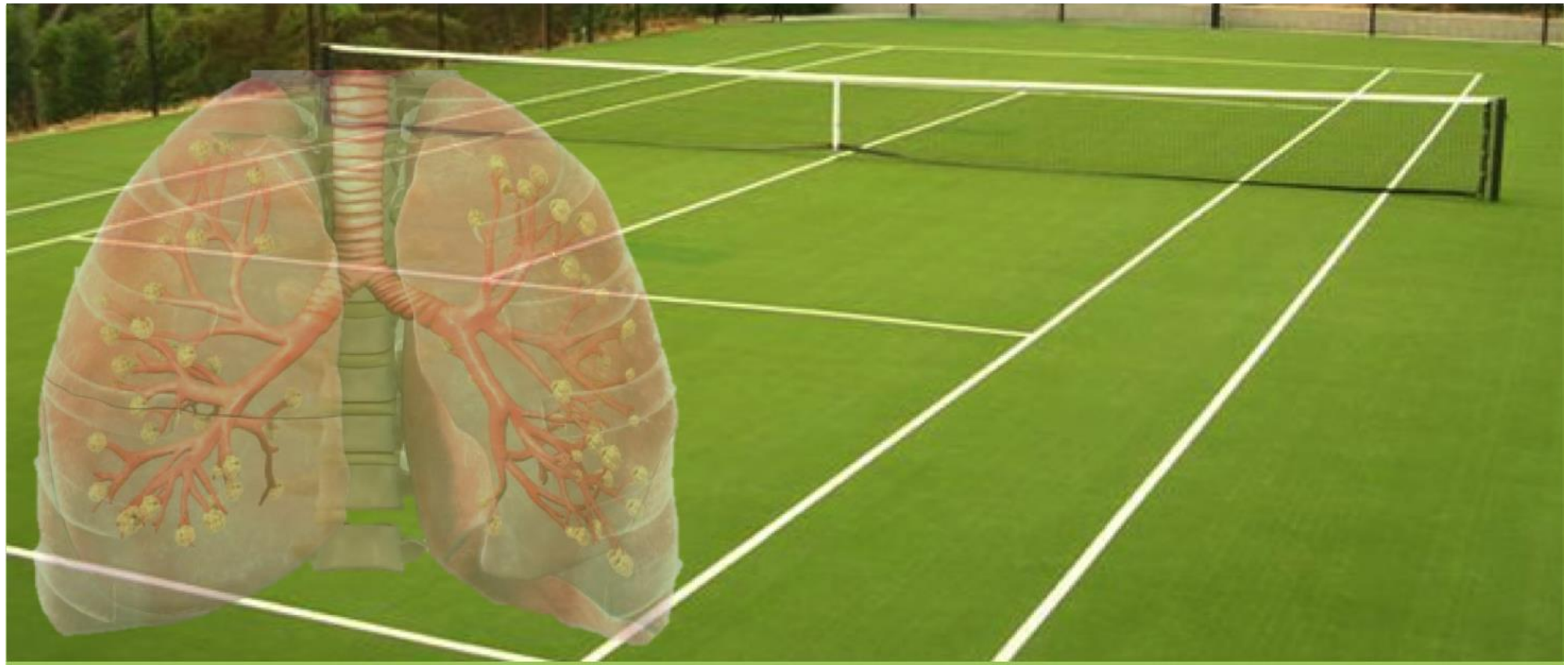
The Great Smog of 1952 took hold on London 65 years ago, claiming an estimated 4200 lives (increasing to 12,000 over following year)

60 years after the Clean Air Act: the toxic legacy of King Coal.

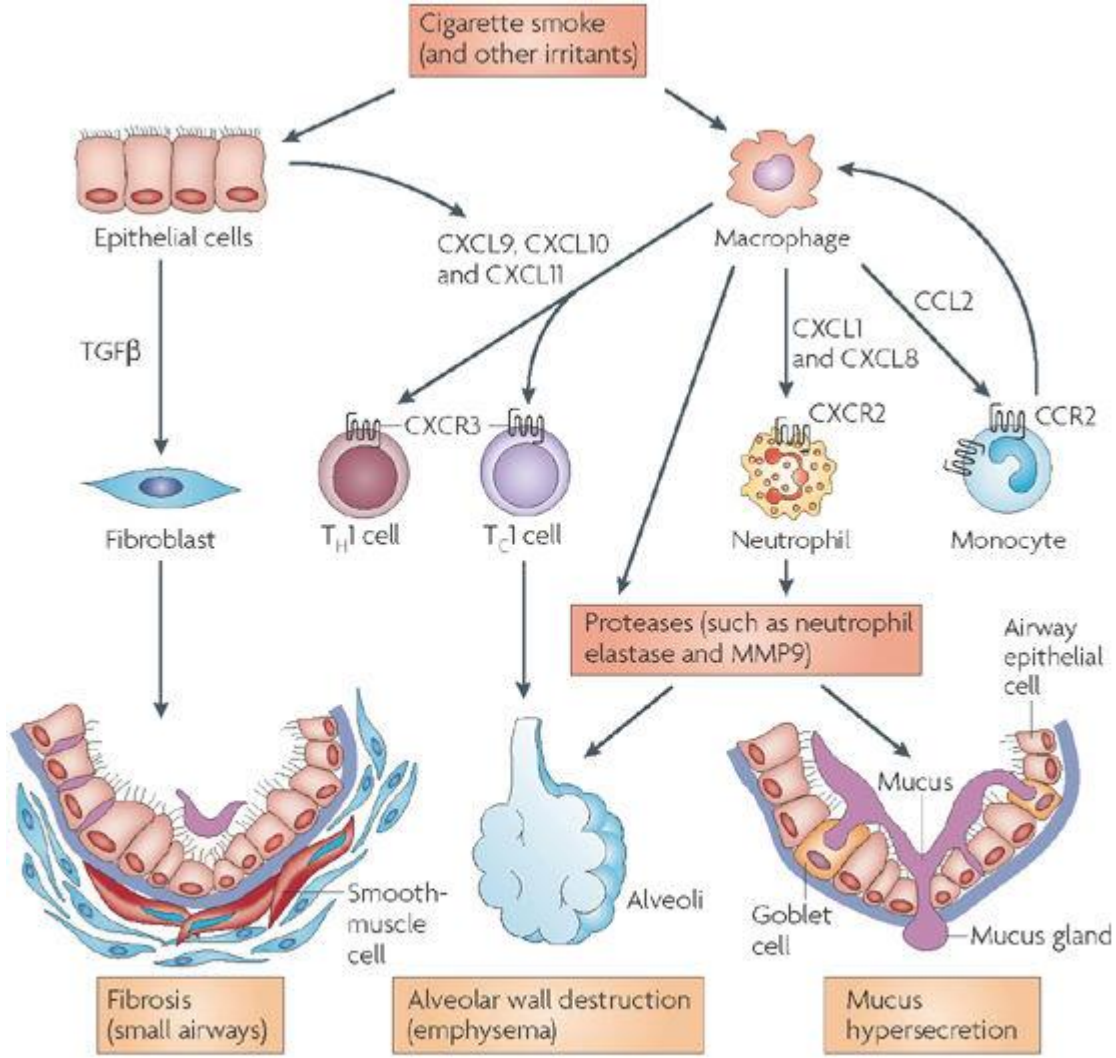
D.I.W. Phillips, C. Osmond, H. Southall, P. Aucott, A. Jones, S. Holgate

Coal was the major cause of pollution in the UK until the Clean Air Act of 1956 led to a rapid decline in consumption.

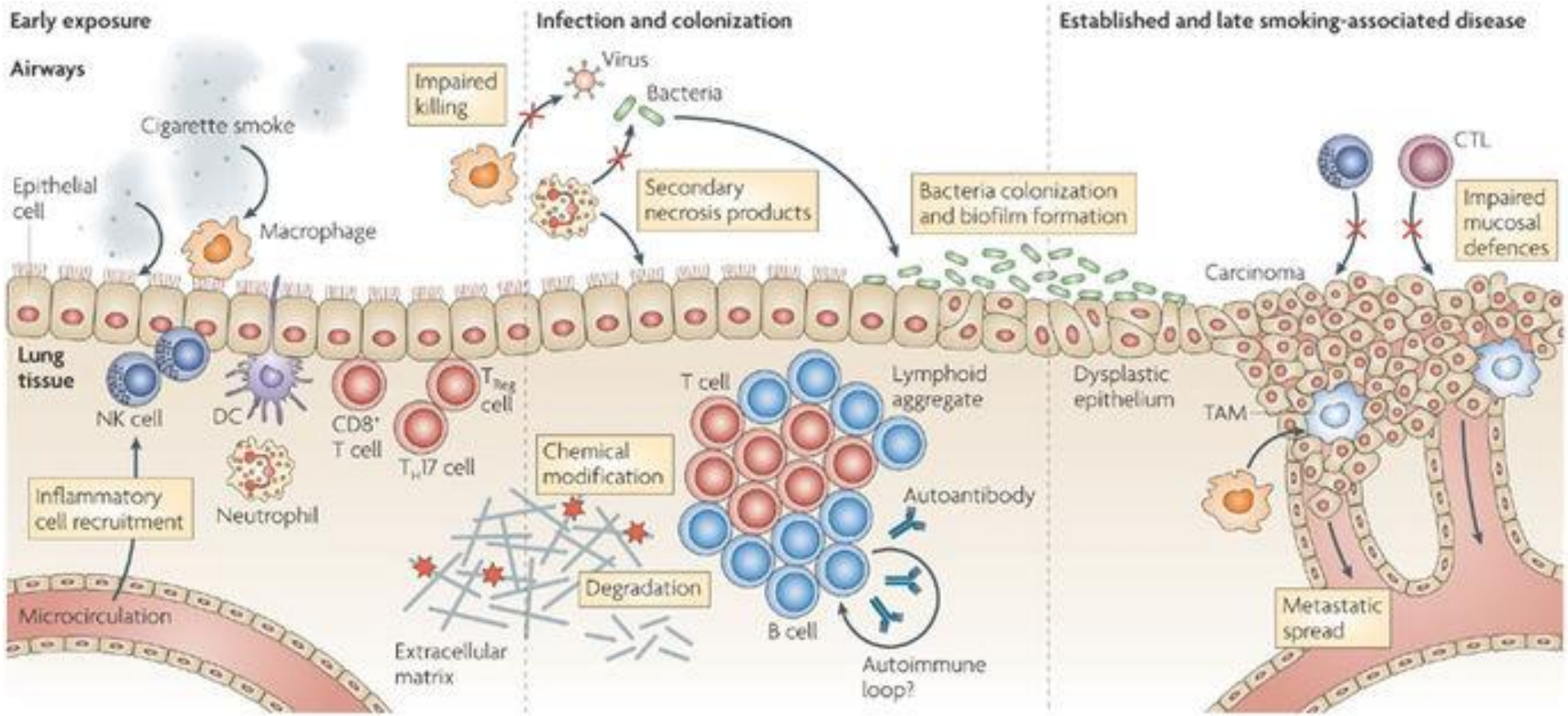
Although based on geographical correlations, our data provide convincing evidence that coal-based pollution, experienced over 60 years ago in young children, affects human health now, by increasing mortality from a wide variety of diseases.



The surface area of a human lung is equal to that of a tennis court



Nature Reviews | Immunology



Nature Reviews | Immunology

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- Air Pollution in Colchester
- The Solutions

Air pollution monitoring

1961 UK established the world's first co-ordinated national air pollution monitoring network: the National Survey.

black smoke and sulphur dioxide at around 1200 sites

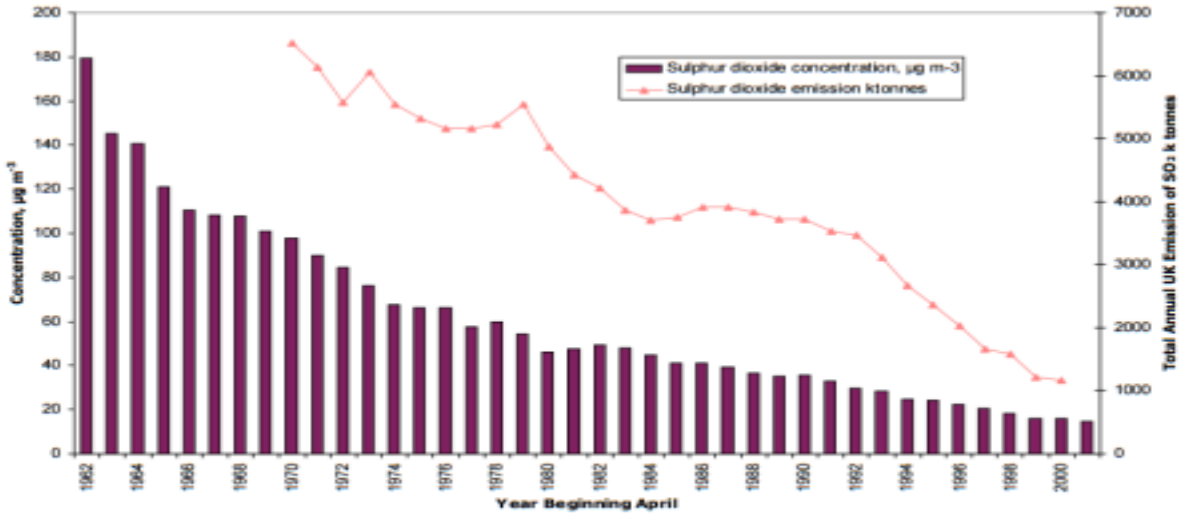

Figure 5b SO_2 only: Annual Emissions and Annual Mean Ambient Concentrations of SO_2.

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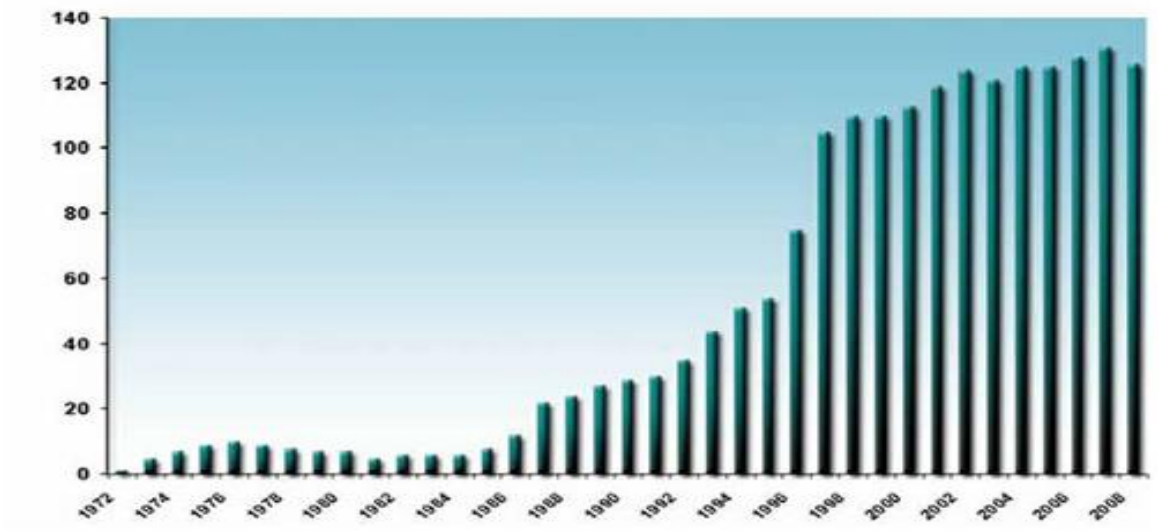
Air pollution monitoring

1992 - Enhanced Urban Network
1995 - all statutory and other urban monitoring consolidated into one programme
1998 - separate UK urban and rural automatic networks were combined to form Automatic Urban and Rural Network

2016 - 127 sites across the UK
Includes - NOx, SO2, O3, CO, PM10, PM2.5.

Figure 1: Number of government funded automatic measurement stations in the UK



https://uk-air.defra.gov.uk/networks/network-info?view=aurn

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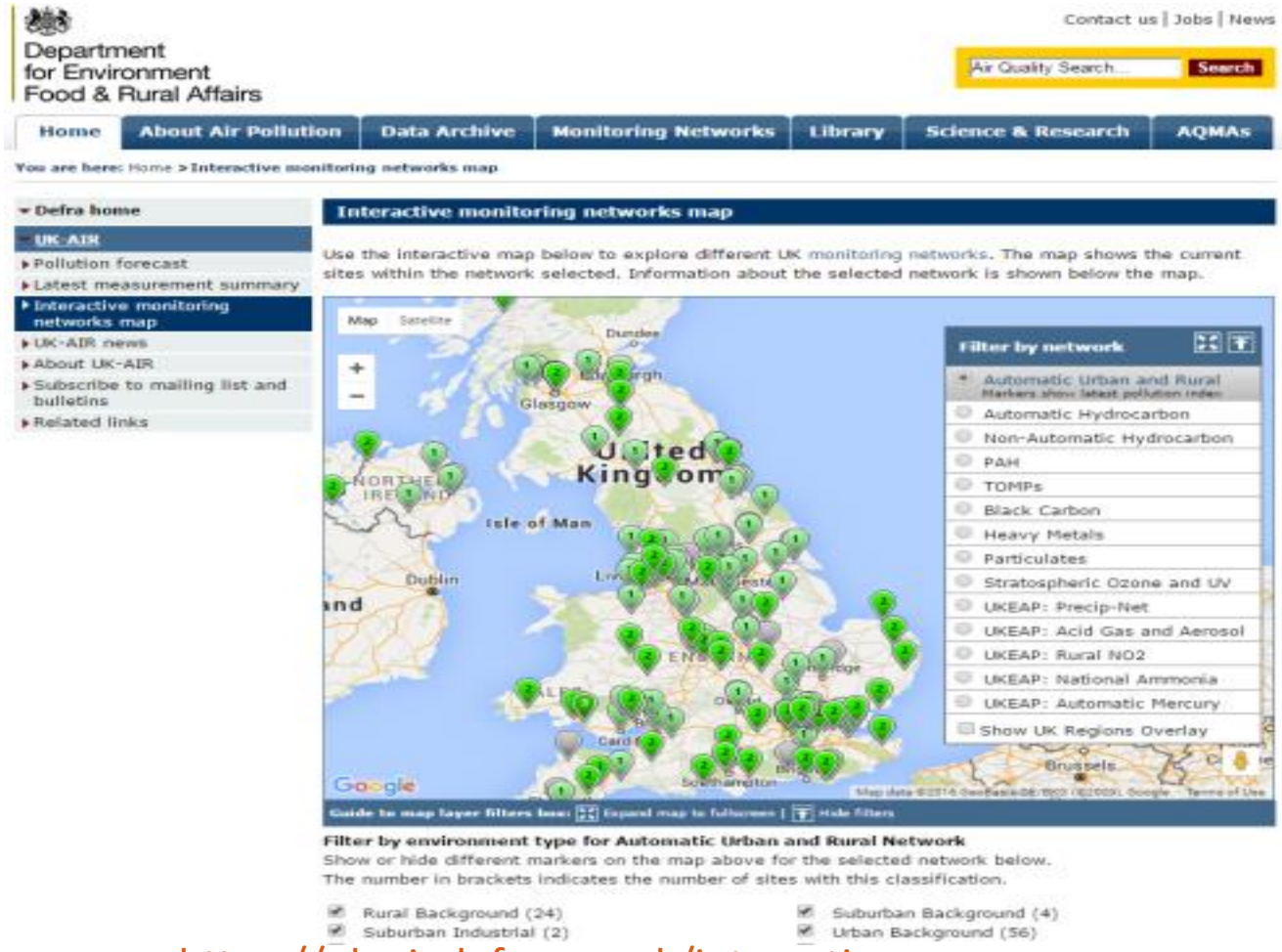
Data



https://uk-air.defra.gov.uk/interactive-map

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Air Quality Management Areas

Since December 1997 each local authority has been carrying out a review and assessment of air quality in their area

Aim : to ensure that the national air quality objectives are achieved

If not: a Local Air Quality Action Plan.

Department for Environment Food & Rural Affairs

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Home | About Air Pollution | Data Archive | Monitoring Networks | Library | Science & Research | AQMAs

You are here: Home > Air Quality Management Areas (AQMAs)

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- UK-AIR
- Air Quality Management Areas (AQMAs)
  - AQMAs interactive map
  - Summary AQMA data
  - List of Local Authorities with AQMAs
  - List of Revoked AQMAs
  - Who to contact
  - AQMA Administration Area

Air Quality Management Areas (AQMAs)

What are Air Quality Management Areas?

Since December 1997 each local authority in the UK has been carrying out a review and assessment of air quality in their area. This involves measuring air pollution and trying to predict how it will change in the next few years. The aim of the review is to make sure that the national air quality objectives (PDF) will be achieved throughout the UK by the relevant deadlines. These objectives have been put in place to protect people's health and the environment.

If a local authority finds any places where the objectives are not likely to

You may also be interested in...

- LAQM Report Submission Website
- LAQM Diffusion Tube data centre
- UK Smoke Control Areas
- International, European and national standards for air quality

Partners

Bureau Veritas Solutions
The information on these pages is provided by Bureau Veritas Solutions, part of the Bureau Veritas Group.

http://aqma.defra.gov.uk/aqma/home.html

Air quality objectives

Pollutant	Objective	Averaging Period
Nitrogen dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times/year	1-hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM_{10})	50 µg/m^{3}not to be exceeded more than 35 times/ year	24-hour mean
	40 µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	266 µg/m^3 not to be exceeded more than 35 times/year	15 minute mean
	350 µg/m^{3}not to be exceeded more than 24 times/year	1-hour mean
	125 µg/m^{3}not to be exceeded more than 3 times/year	24-hour mean
Benzene (C_6H_6)[12]	16.25 µg/m^3	Running annual mean
	5.00 µg/m^3	Annual mean
1,3-butadiene (C_4H_6)[12]	2.25 µg/m^3	Running annual mean
Carbon Monoxide(CO)[12]	10.00 mg/m^3	Maximum daily running 8-hour mean
	10.00 mg/m^3	Running 8-hour mean
Lead (Pb)[12]	0.5 µg/m^3	Annual mean
	0.25 µg/m^3	Annual mean


“NOxford Street” 2014:
Annual mean: 143 µg/m3
1532 hours > 200 µg/m3
GAP
GAP
23
THE LION KING
137
Oxford Circus
ARRIVA

What about PM2.5?

- no regulatory standard
- EU Ambient Air Quality Directive sets standards for PM2.5
- annual average EU limit value: 25 μg/m^3 to be met by 2020
- EU target value of 15% reduction at background urban locations between 2010 and 2020

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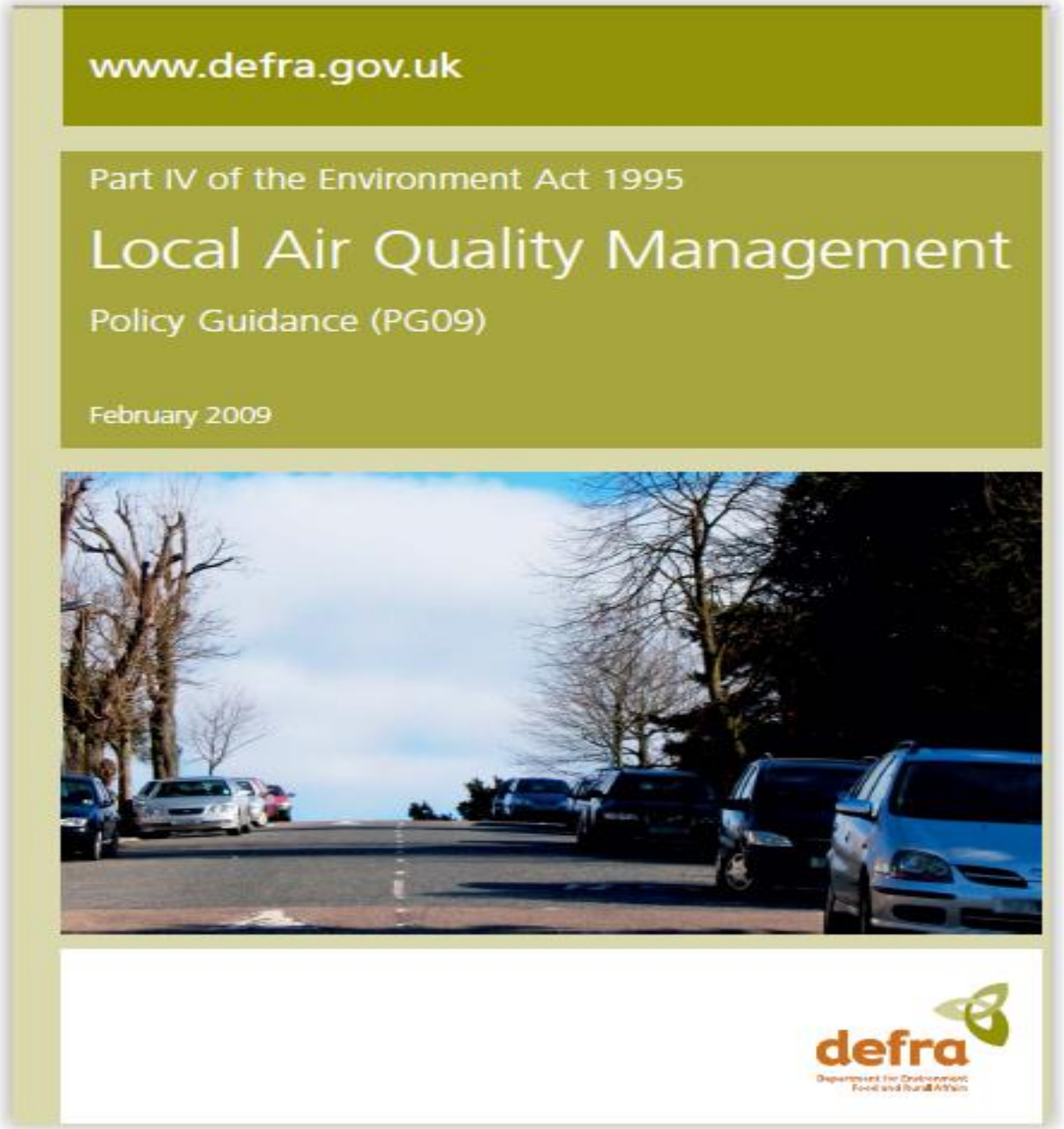
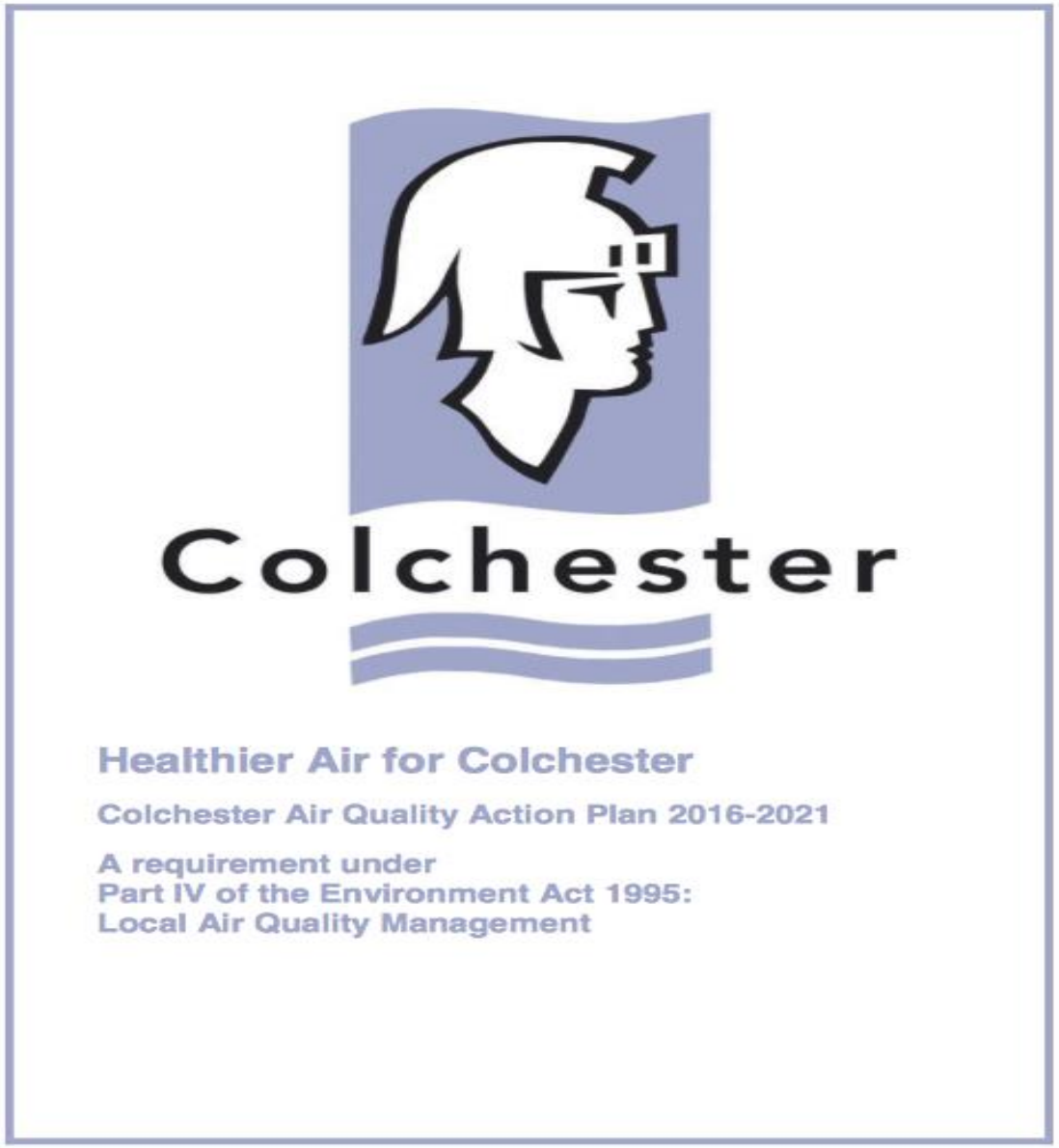
- Introduction
- Air Pollution is Changing
- The Proof Of Harm
- Air Monitoring
- Air Pollution in Colchester
- The Solutions



- Colchester Borough Council (CBC) has a statutory duty to review and assess air quality and pursue the achievement of Air Quality Objectives, as part of the requirements of the Environment Act 1995
- Annual Colchester Local Air Quality Management Progress Report

- AQAP
- 7 Pollutants
- NO2 Monitoring
- Mortality Mapping
- Numbers of deaths in Colchester 2’ Pollution
- Financial cost
- Legal obligations
- Tackling the Problem



- Air Quality Action Plan (AQAP). This plan outlines an ambitious set of measures we will take to improve air quality in Colchester between 2016 and 2021.

- The following officers are responsible for the development of this Action Plan:
- Belinda Silkstone - Environmental Protection Manager (Colchester Borough Council)
- Tim Savage - (Chelmsford City Council)
- Paul Wilkinson - Transportation Policy Manager (Colchester Borough Council)

The Strategy includes health-based objectives for pollutants of most concern - nitrogen dioxide, particles, ozone, sulphur dioxide, carbon monoxide, lead, benzene, and 1,3-butadiene. The objectives included in the Regulations are shown in Table 2.1.

Table 2.1 AIR QUALITY OBJECTIVES

Substance	Air Quality Objective levels
Benzene	16.25 μg m^{-3} (5 ppb) or less, when expressed as a running annual mean to be achieved by 31 December 2003
1,3-Butadiene	2.25 μg m^{-3} (1 ppb) or less, when expressed as a running annual mean to be achieved by 31 December 2003
Carbon Monoxide	11.6 μg m^{-3} (10 ppm) or less, when expressed as a running 8 hour mean to be achieved by 31 December 2003
Lead	0.5 **μ**gm^{-3} or less, when expressed as an annual mean to be achieved by 31 December 2004; 0.25 μg m^{-3} or less, when expressed as an annual mean to be achieved by 31 December 2008
Nitrogen Dioxide	200 μg m^{-3} (105 ppb) or less, when expressed as an hourly mean not to be exceeded more than 18 times a year to be ahcieved by 31 December 2005; 40 μg m^{-3} (21 ppb) or less, when expressed as an annual mean to be achieved by 31 December 2005
PM_{10}	50 **μ**gm^{-3} or less, when expressed as a 24 hour average not to be exceeded more than 35 times a year to be achieved by 31 December 2004
Sulphur Dioxide	350 μg m^{-3} (132 ppb) or less, when expressed as a 1 hour mean not to be exceeded more than 24 times a year to be achieved by 31 December 2004; 266 μg m^{-3} (100 ppb) or less, when expressed as the 15 minute mean not to be exceeded more than 35 times a year to be achieved by 31 December 2005; 125 μg m^{-3} (47 ppb) or less, when expressed as a 24 hour mean not to be exceeded more than 3 times a year to be achieved by December 2004

The Strategy includes health-based objectives for pollutants of most concern - nitrogen dioxide, particles, ozone, sulphur dioxide, carbon monoxide, lead, benzene, and 1,3-butadiene. The objectives included in the Regulations are shown in Table 2.1.

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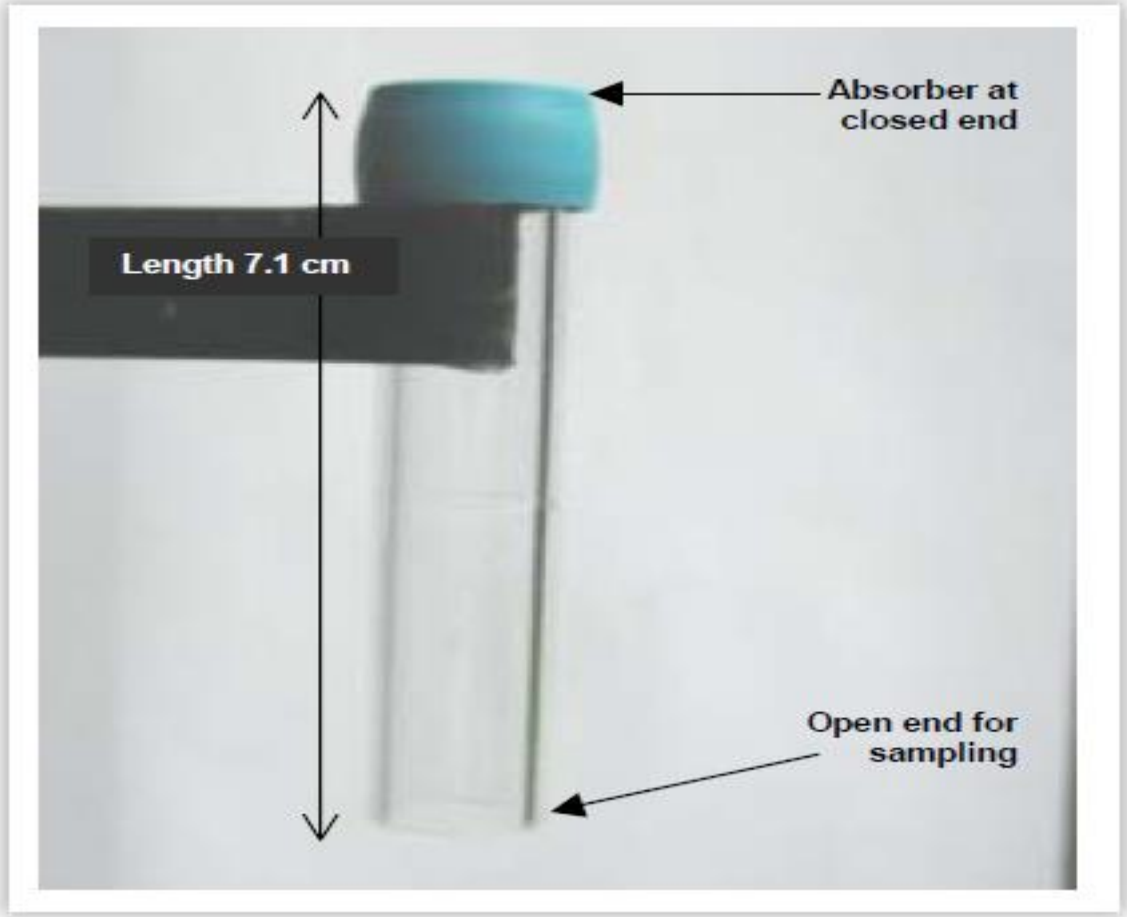
“Of the seven pollutants included in LAQM, only Nitrogen Dioxide (NO2) has been assessed to exceed the Air Quality Objectives”.

- In order to assess local air quality, the Council operates one automatic monitoring station sited in Brook Street, Colchester. In addition there are 59 NO2 diffusion tubes sites located across the Town.



Gradko International
NO2 diffusion tubes

Figure 2.1 Map of Diffusion Tube Locations in Marks Tey

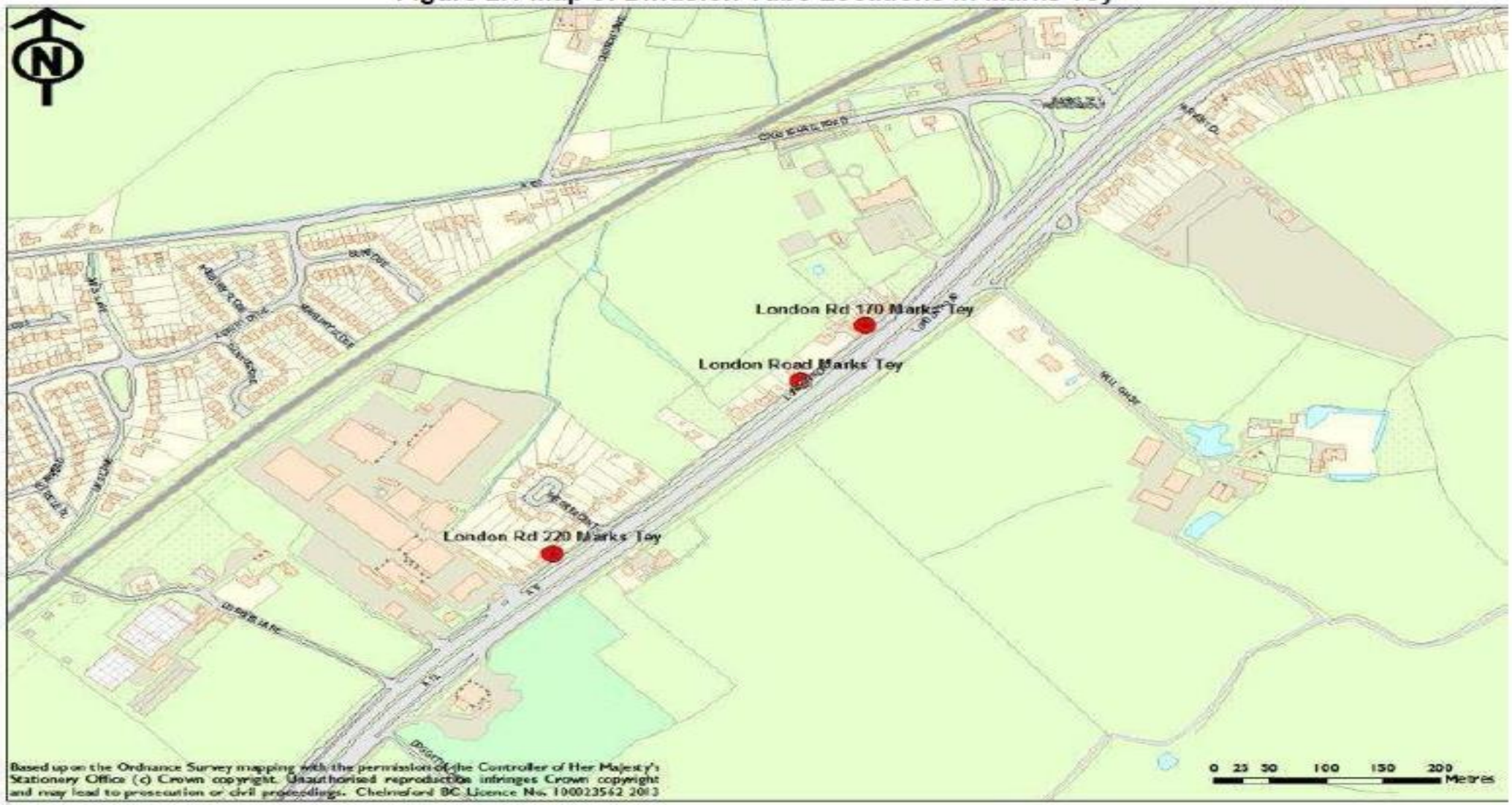


Figure 2.2 Map of Diffusion Tube Locations near Lucy Lane

Figure 2.3 Map of Diffusion Tube Locations near Maldon Road

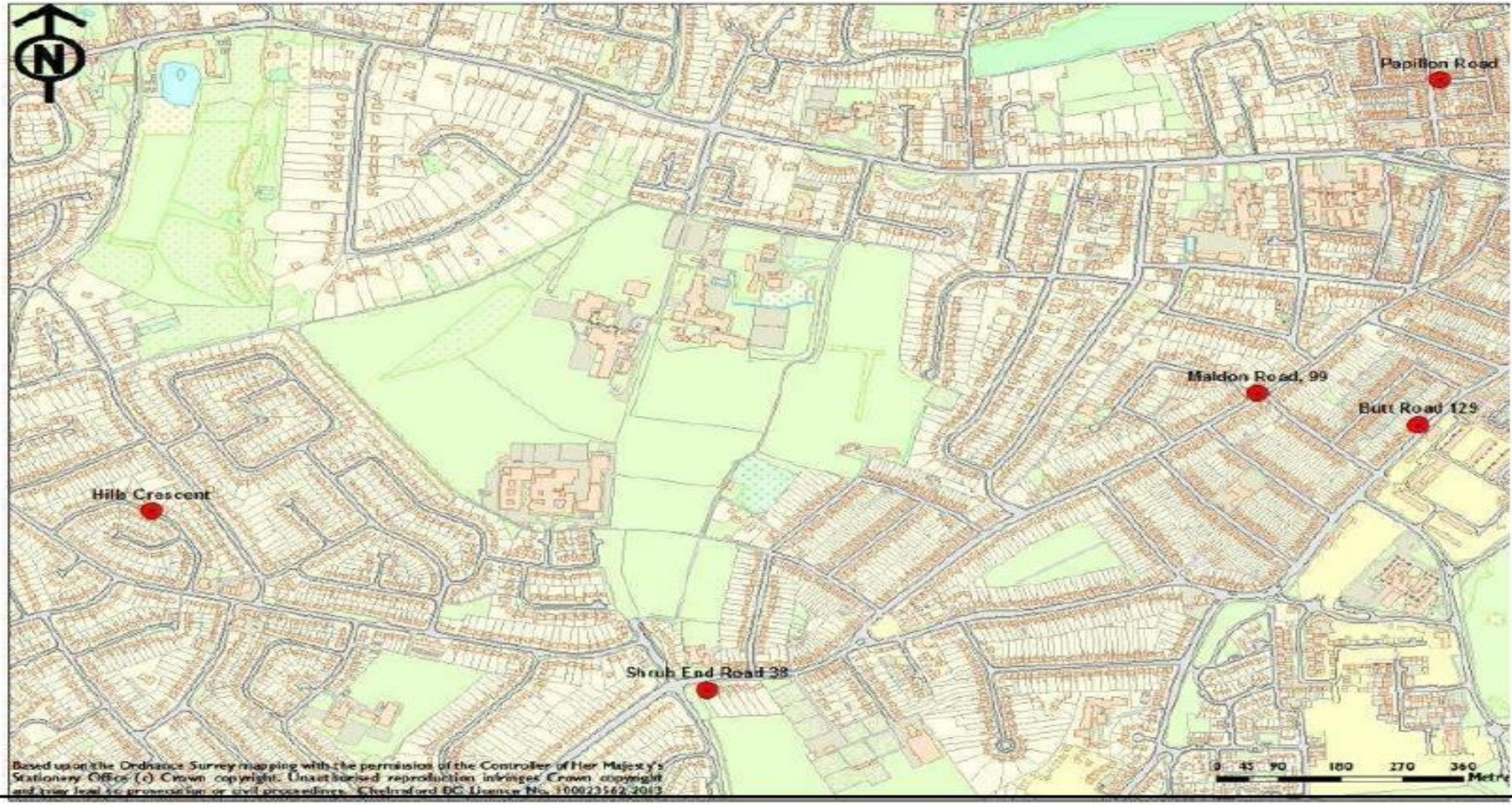


Figure 2.4 Map of Diffusion Tube and Automatic Monitoring Station Locations in Town Centre

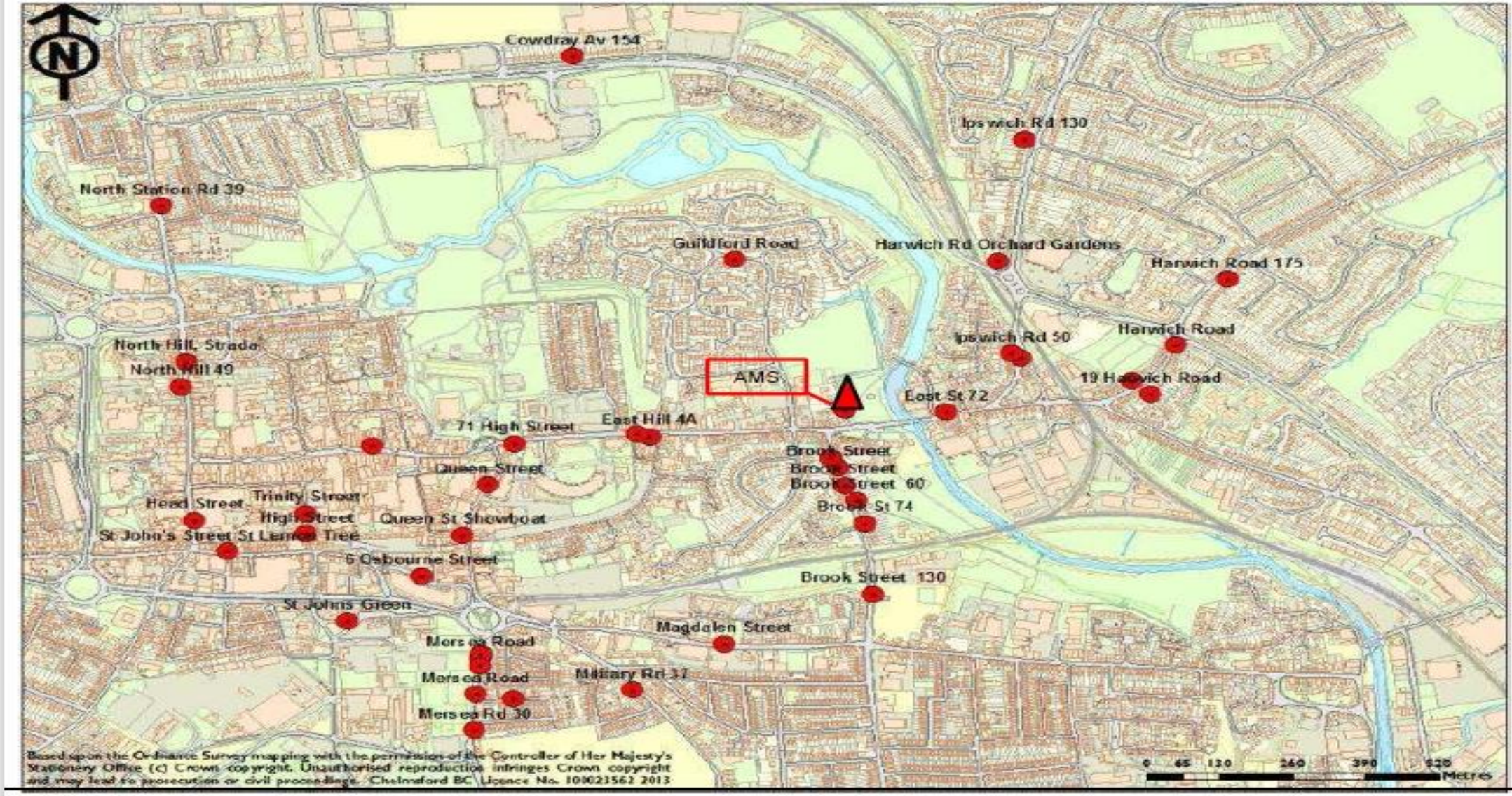


Figure 2.5 Map of Diffusion Tube Locations near St Andrews Avenue

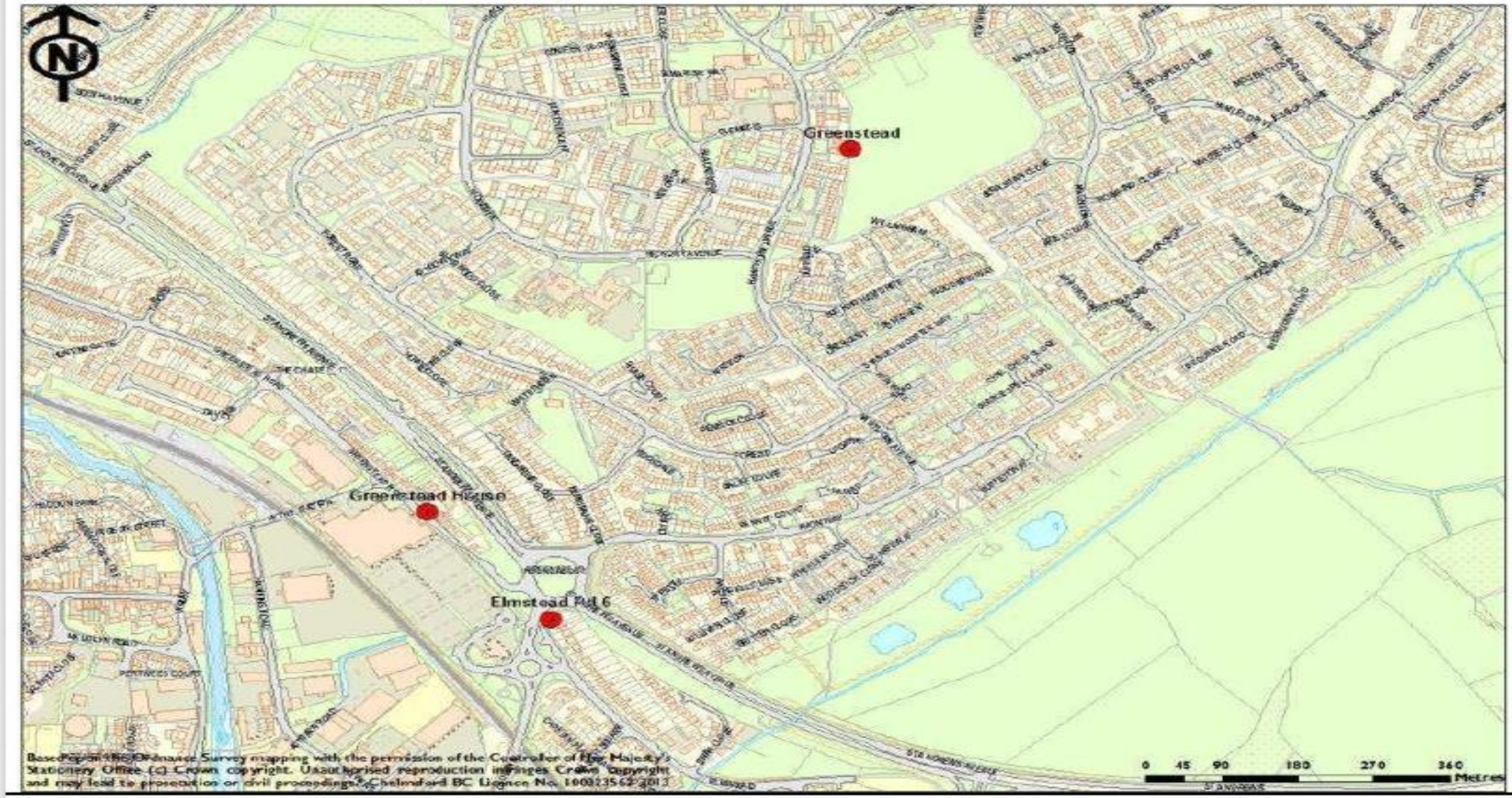


Figure 2.6 Map of Diffusion Tube Locations on Mill Road

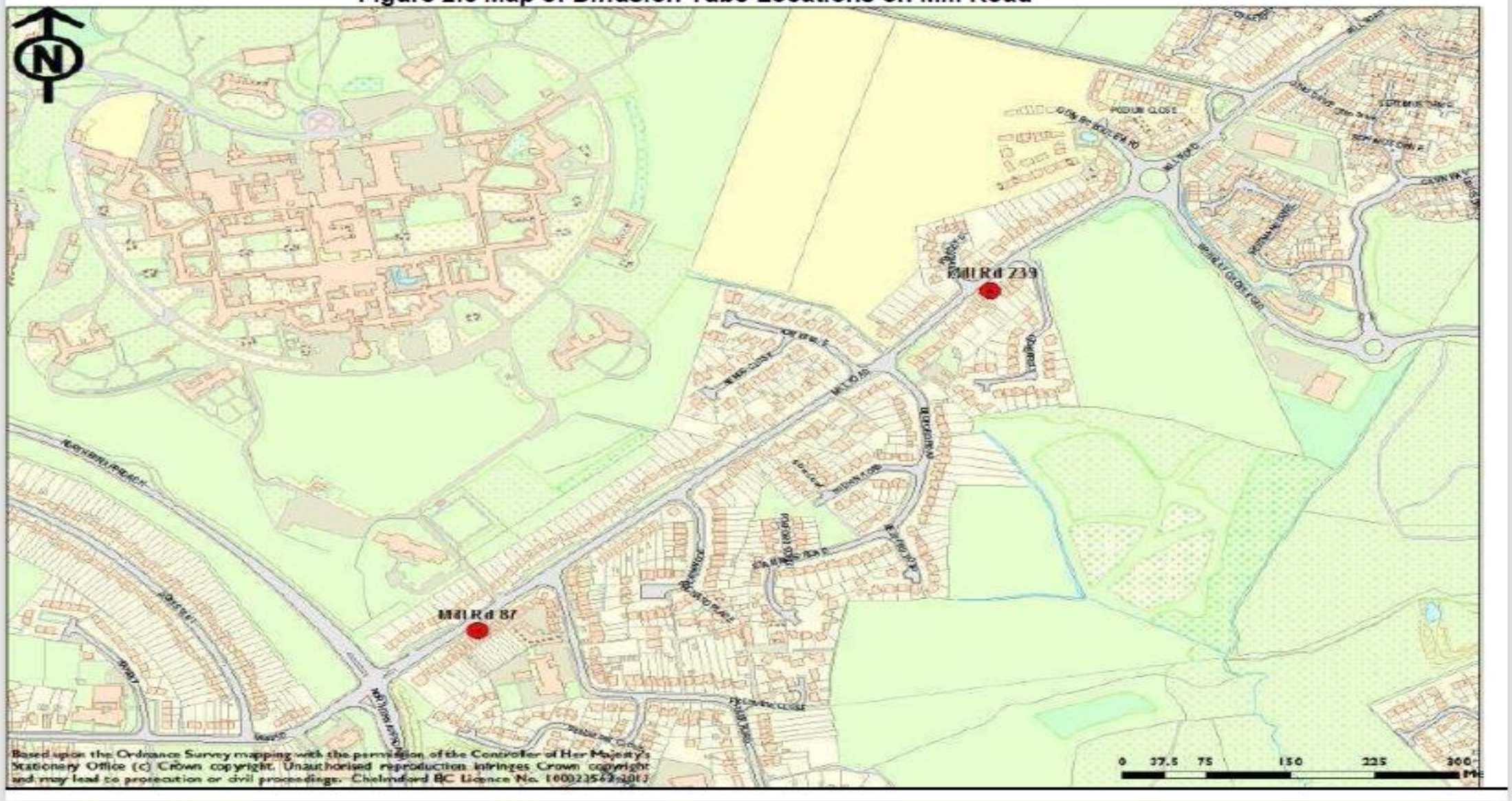


Table 1 Air Quality Objectives for Nitrogen Dioxide

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Nitrogen Dioxide	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005

Figure 2.7 Trends in Hourly Mean NO_2 Concentration at Brook Street Automatic Monitoring Station

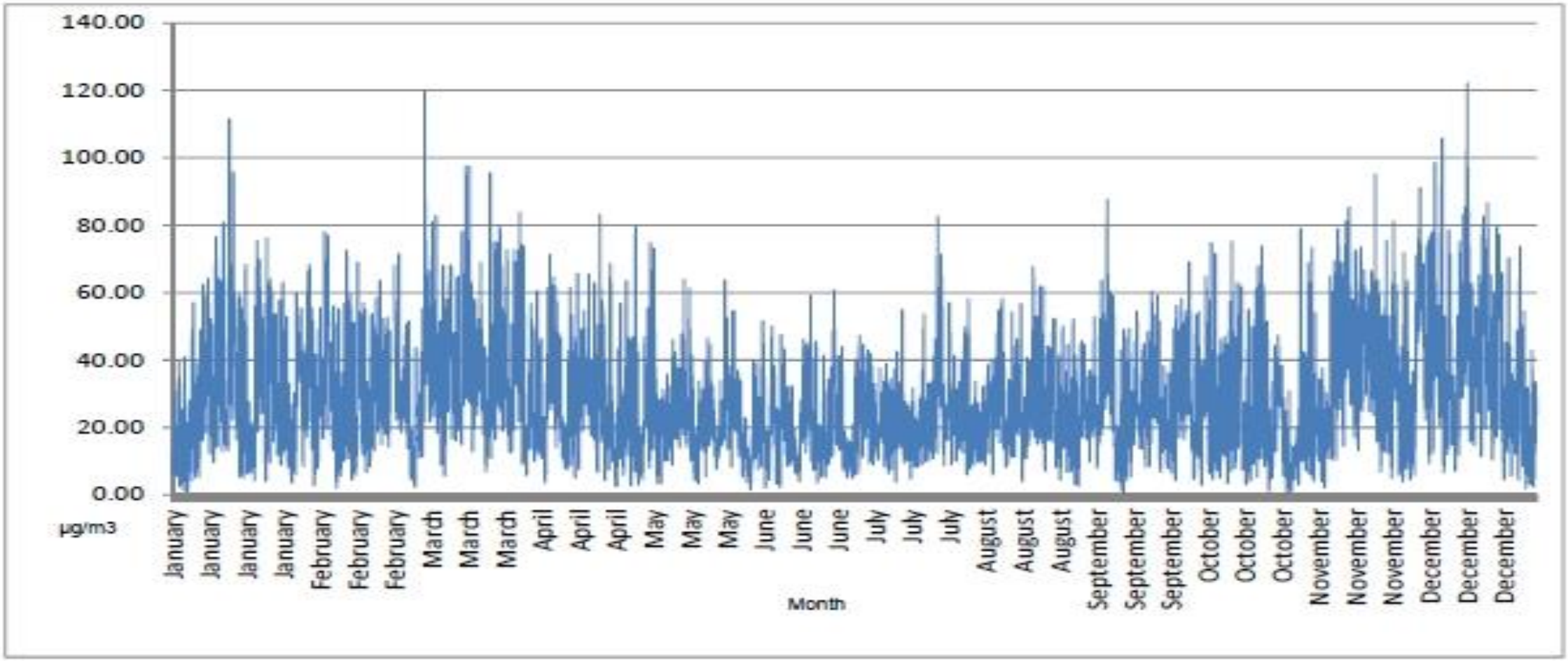
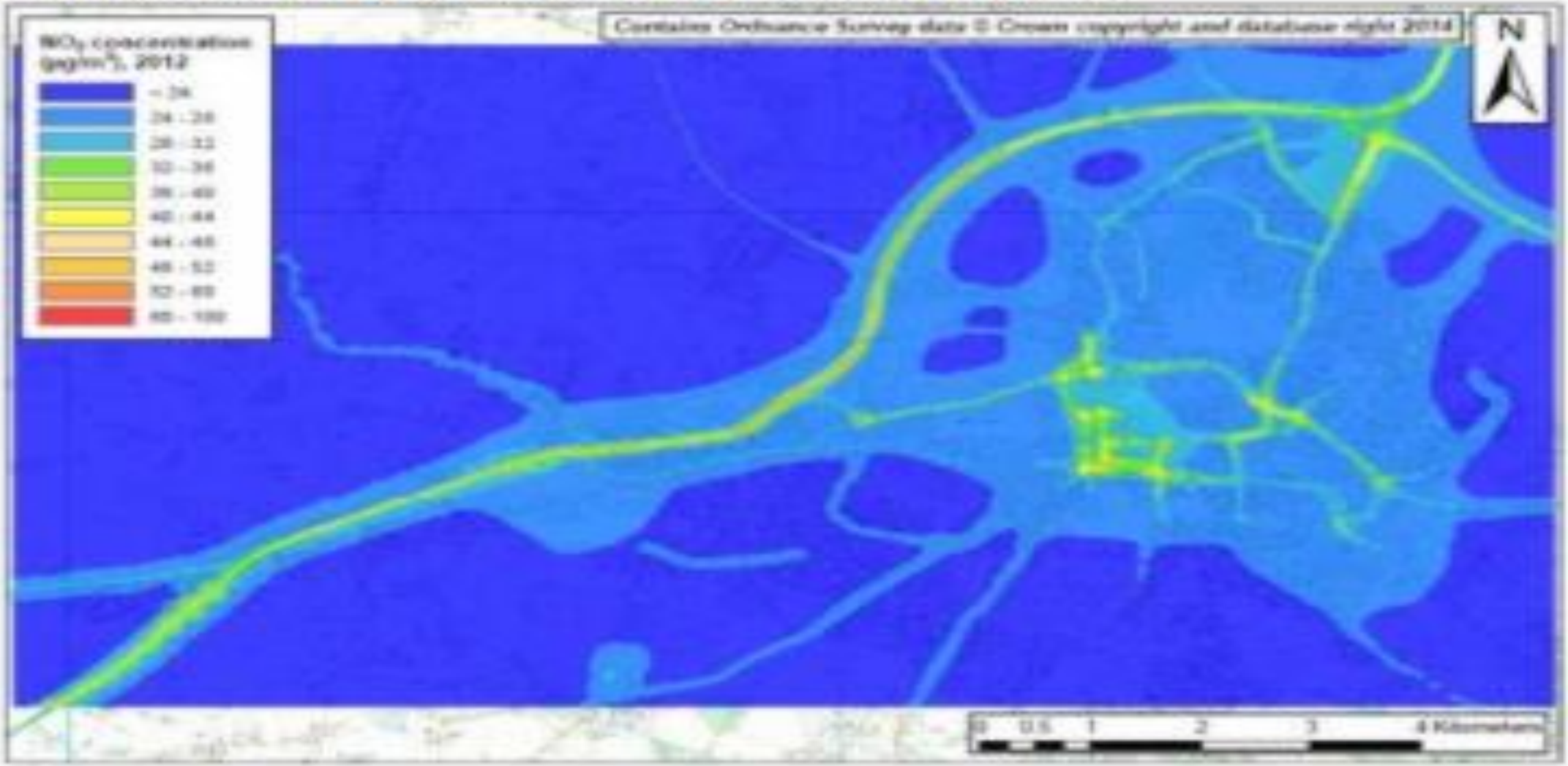
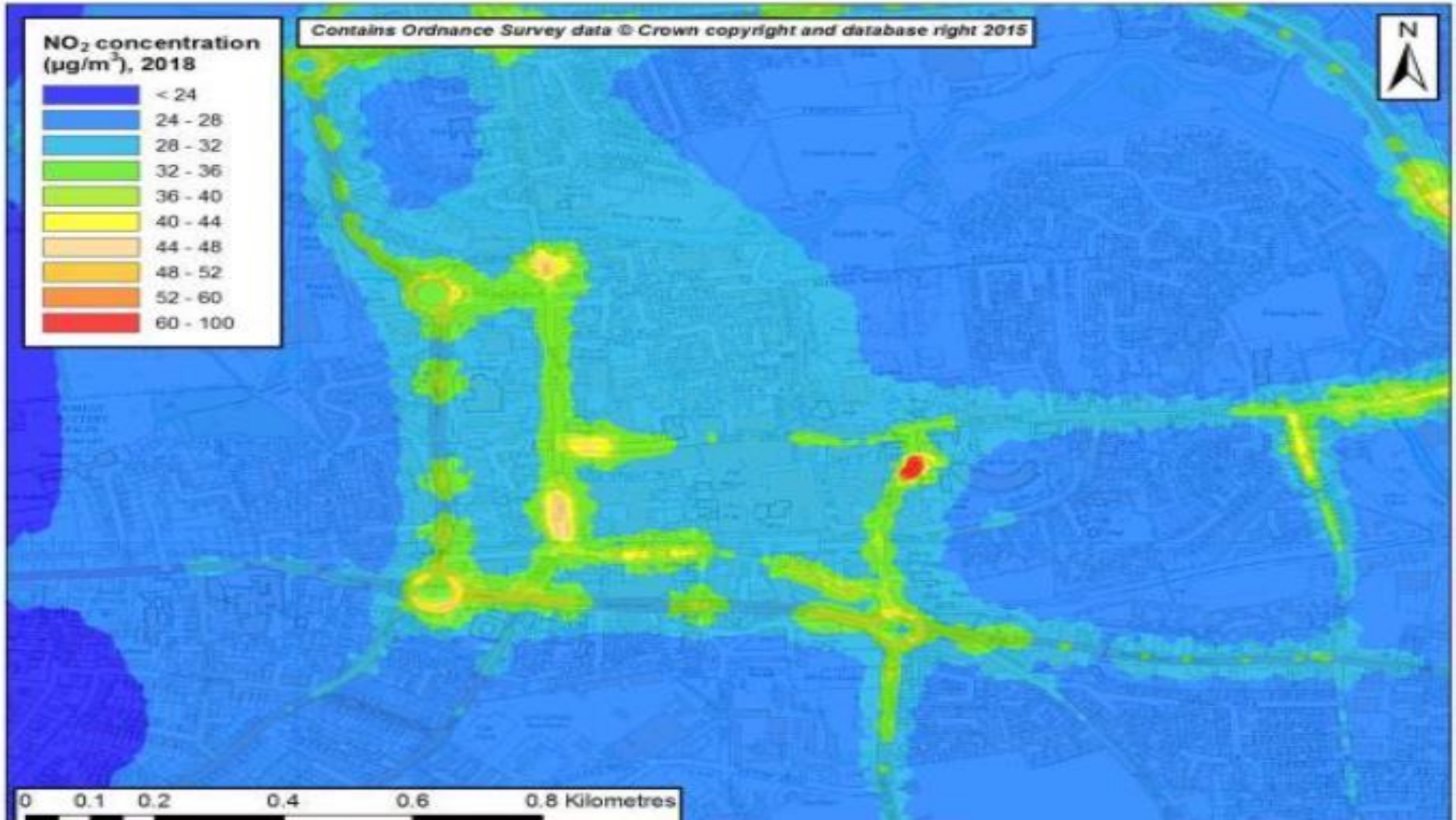


Figure 4 Predicted Annual Average NO_2 Concentrations 2012

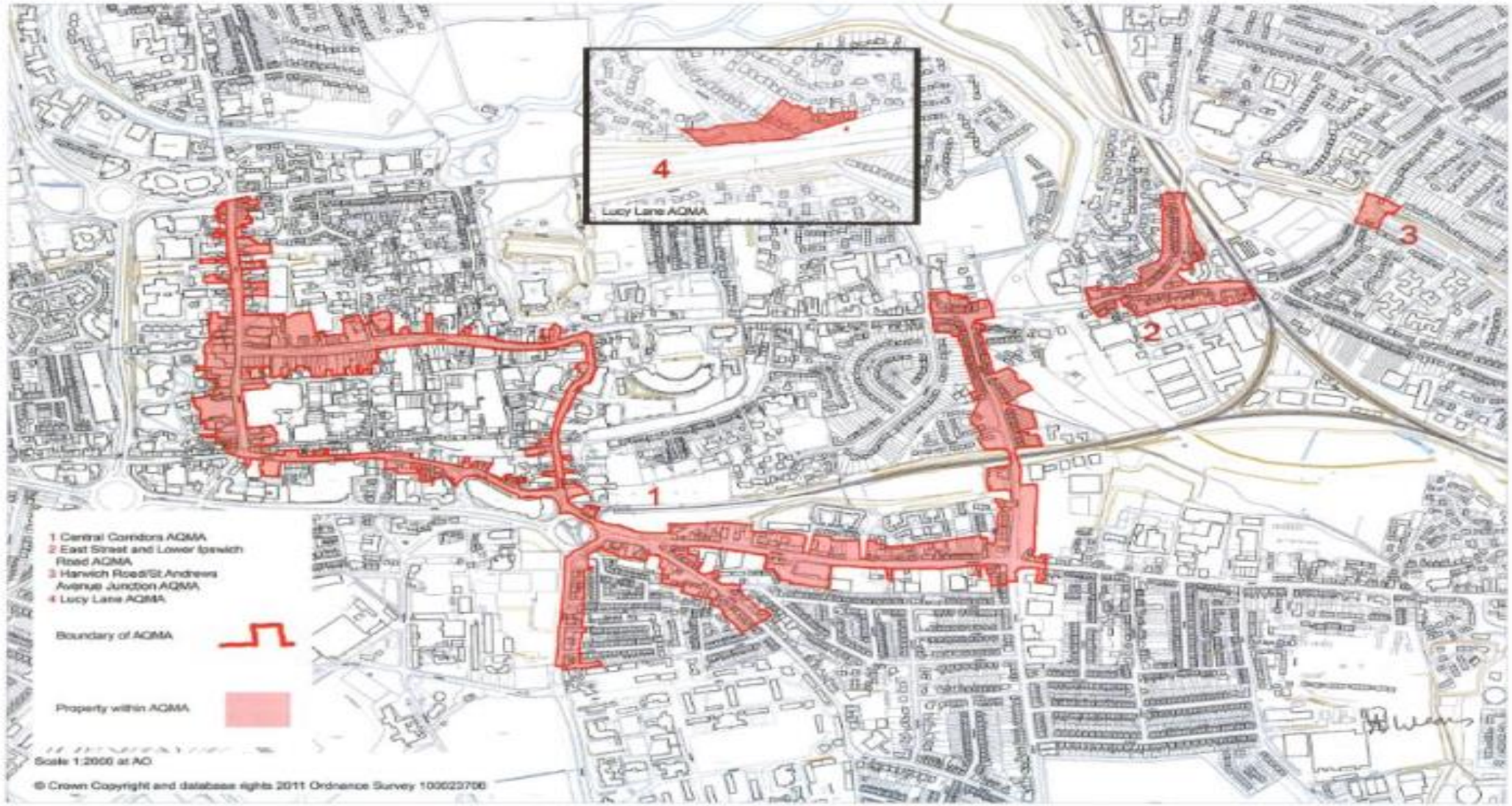


The main source of air pollution in the Borough is road traffic emissions from major roads, notably the A12, A133, A134, A1232, Brook Street and Mersea Road.

Figure 5 – Predicted Annual Average NO_2 concentrations Colchester Town Centre, 2018 base case



- At locations where concentrations of Nitrogen Dioxide have been found to exceed the Air Quality Objectives, Colchester Borough Council has declared four Air Quality Management Areas (AQMAs).
- Area 1 (Central Corridors) ¡V include High Street, Head Street, North Hill, Queen Street, St. Botolph¡¦s Street, St. Botolph¡¦s Circus, St. John¡¦s Street, Osborne Street, Magdalen Street, Military Road, Mersea Road, Brook Street, East Street and St John¡¦s Street.
- Area 2 East Street and the adjoining lower end of Ipswich Road.
- Area 3 Harwich Road/St Andrew¡¦s Avenue junction
- Area 4 Lucy Lane North, Stanway.


4
Lucy Lane AQMA
3
2
1
1 Central Corridors AQMA
2 East Street and Lower Ipswich Road AQMA
3 Harwich Road/St Andrews Avenue Junction AQMA
4 Lucy Lane AQMA
Boundary of AQMA
Property within AQMA
Scale 1:2000 at A0
© Crown Copyright and database rights 2011 Ordnance Survey 100023706

- Colchester Borough Council commissioned Cambridge Environmental Research Consultants Ltd (CERC) to carry out a baseline air quality modelling study to support the development of the Low Emission Strategy, a Low Emission Zone feasibility study and the Air Quality Action Plan.

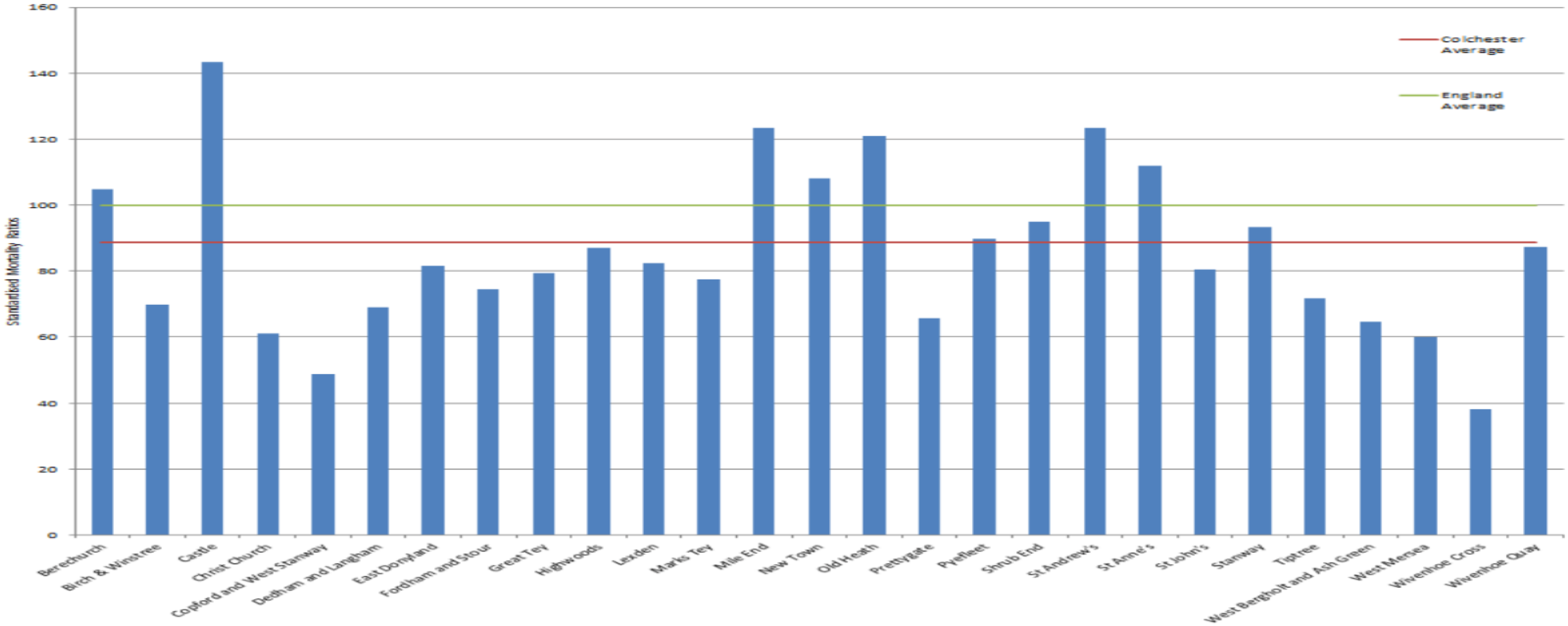
- The study used air quality modelling to produce high resolution air quality maps to identify pollution hot spots and carry out source apportionment work. The baseline was produced for the year 2012.

- Colchester like many other busy urban areas exceeds the legal limits for air quality.
- OUR AIR POLLUTION IS ILLEGAL!
- Does it matter?

Correlation of Air Quality & Cause of Death in Colchester

- Local Public Health data was assessed to see if there was a correlation between air quality and cause of death by respiratory disease in Colchester. It was found that although the majority of Wards were better than the national average, seven wards fared worse.

Figure 17 Cause of Death in Colchester Chart 2008-2012 (all ages) – Respiratory Disease



The areas above the average for England are located centrally. The Castle ward exceeds the average for England by over 125%.

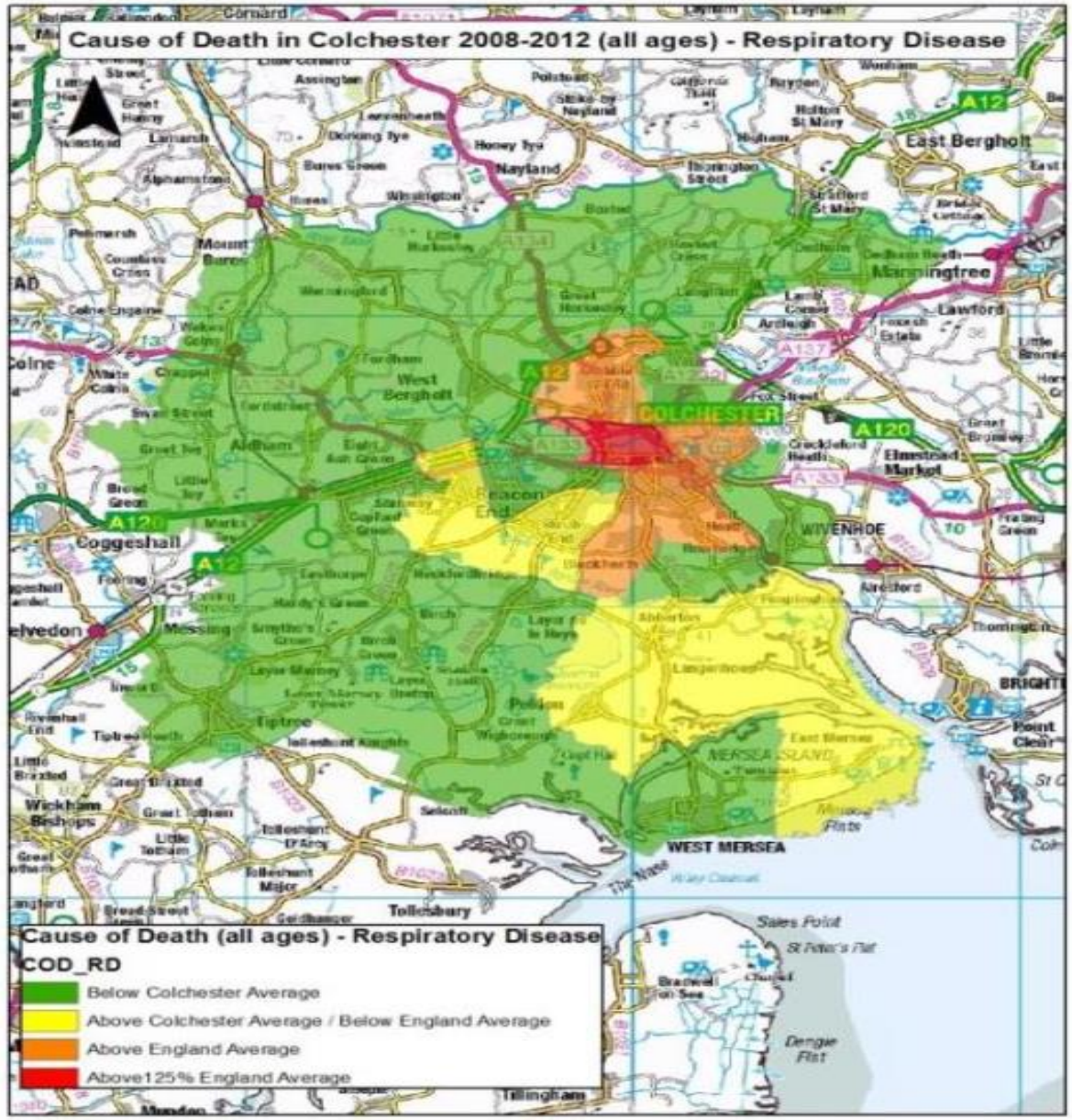
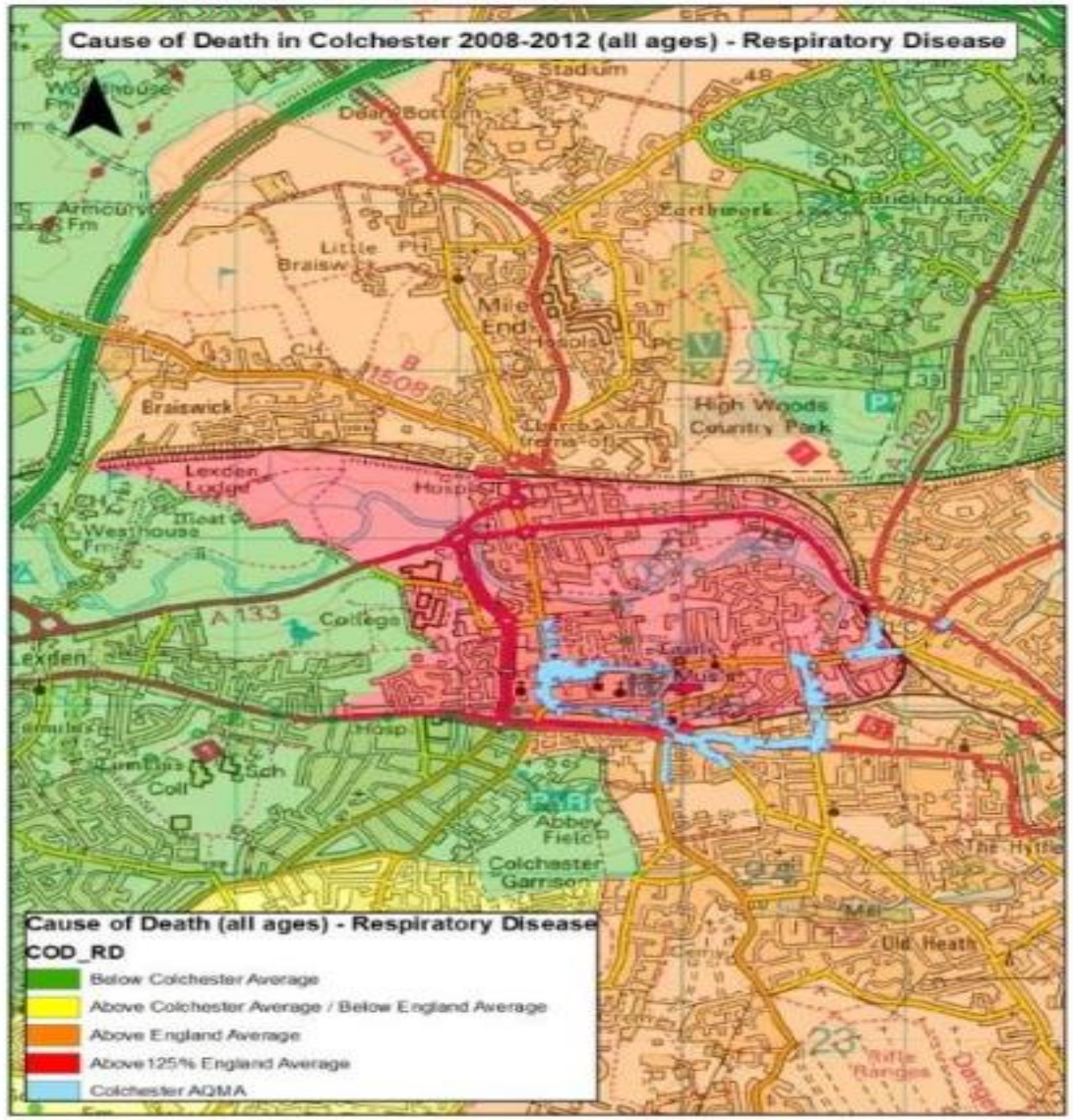

Cause of Death in Colchester 2008-2012 (all ages) - Respiratory Disease
COLCHESTER
East Bergholt
Manningtree
Lawford
Mount Bures
West Bergholt
Coggeshall
Messing
Tiptree
Wivenhoe
Elmstead Market
Alresford
Wickham Bishops
Tolleshunt D'Arcy
Tolleshunt Major
Tollesbury
WEST MERSEA
Mersea Island
Sales Point
St Peter's Flat
Dengie Flat
Tillingham
Cause of Death (all ages) - Respiratory Disease
COD_RD
Below Colchester Average
Above Colchester Average / Below England Average
Above England Average
Above125% England Average

Figure 19 Cause of Death in Colchester Map 2008-2012 (all ages) – Respiratory Disease – Town Centre Area (AQMAs overlaid)



How many deaths in Colchester/year?

- In 2010 the Committee on the Medical Effects of Air Pollutants (COMEAP) published a report that concluded nearly 29,000 deaths in the UK at typical ages were caused by fine particulate matter air pollution (PM2.5). This represented a loss of total population life of 340,000 life years.

- COMEAP are due to publish a further report in 2016 which will estimate the deaths caused by Nitrogen Dioxide. Defra has indicated that the initial estimates are that this will be equivalent to 23,500 deaths annually in the UK.

- These figures represent mortality rates of 5.7% (PM2.5) and 4.6% (NO2) in the United Kingdom. In local terms, using the Public Health Outcomes Framework Indicator 3.01 which is defined as the fraction of all-cause adult mortality attributable to anthropogenic particulate air pollution (measured as fine particulate matter, PM2.5). Colchester is currently measured at 5.6%.
- Translating these mortality rates locally, nitrogen dioxide would represent a 4.5% mortality rate and combined with particulate matter, this would be 10.1% of deaths in Colchester attributable to air pollution. In 2013, this would equate to approximately 143 deaths.

143 deaths in Colchester

- Defra have projected that annually there are in excess of 50,000 deaths in the United Kingdom attributable to air quality. For Colchester this equates to approximately 143 (10%) deaths in the Borough.

Colchester

Healthier Air for Colchester

Colchester Air Quality Action Plan 2016-2021

A requirement under
Part IV of the Environment Act 1995:
Local Air Quality Management

Tackling the Problem

- The Core Principles
- Principle 1: Transport Planning
- Principle 2: Public Health Engagement
- Principle 3: Raise Awareness of Air Quality
- Principle 4: Integrate Air Quality into Council Policies
- Principle 5: Continued Assessment of Colchester's Air Quality
- Principle 6 Reduce Emissions From Personal Car Use
- Principle 7: Low Emission Passenger Transport
- Principle 8: Low Emission Freight & Logistics
- Principle 9: Reducing the Impact of Development Upon Air Quality
- Principle 10: Reducing Exposure to Air Pollution

- Introduction
- Air Pollution is Changing
- The Proof Of Harm
- Air Monitoring
- Air Pollution in Colchester
- The Solutions

The Polluter Pays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MEANWHILE AT THE VW TESTING FACILITY.....
ANOTHER PASS!


THE QUIET DIESEL
ACTYON SPORTS DUAL CAB*
Advanced, direct-injection, turbo diesel power. Innovative super 'quiet' running technology. Brilliant fuel economy. Tough as nails. 2,300kg braked towing capacity. Sounds too good.
*The pig is our friend.
SSANGYONG
WE DO DIESEL

Decarbonise Transport

Jo and her Nissan Leaf

Jo Whitmore is an advanced practitioner in Radiology's CT scanning and has worked for the Trust for 15 years. Through the NHS Fleet Car Lease Scheme, she has leased an electric car and has written about the experience.

"As my commute to work is a round trip of 40 miles per day, running two cars with petrol was a major cost concern as well as monthly payments to cover the monthly lease of the car.

"This scheme is very competitive as there is no deposit initially and the salary sacrifice saves one-third on the payments from tax and National Insurance deductions. But it was still an expensive option for a second car.

"We stumbled across the Nissan Leaf, an electric, medium size family five-door car with a realistic range of 80-90 miles per full charge. At off-peak electric rates, a full charge costs under £2 and takes up to four hours, charged overnight using a timer. We had a dedicated charge point of 7Kw installed for free by a national provider.

"I've had the car for seven months and have travelled more than 6,000 miles. It is capable of not just my daily commute but the many short journeys that we run around town. It's quickly become our preferred mode of transport with our petrol car now only requiring a single tank of fuel a month.

"So far, 6,000 miles has cost about £120, which would be only two tanks of petrol in my old car!

ⓘ *Read the full story on our intranet, under "News":*
www.colchesterhospital.nhs.uk

Decarbonise the Grid

BMJ

Climate change

How much could generic statins save the
Are older antipsychotics obsolete?
The benefits of "off-pump" CABG
New football boots and toxic shock
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Global Health

Addressing the Challenges to World Health

A collection of articles on population health around the world, including a new series of Global Health review articles as well as Perspective and research articles.

REVIEW ARTICLE

Globalization, Climate Change, and Human Health

April 4, 2013 | A.J. McMichael

Climate change af
exposed. This arti
climate change co

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THE LANCET

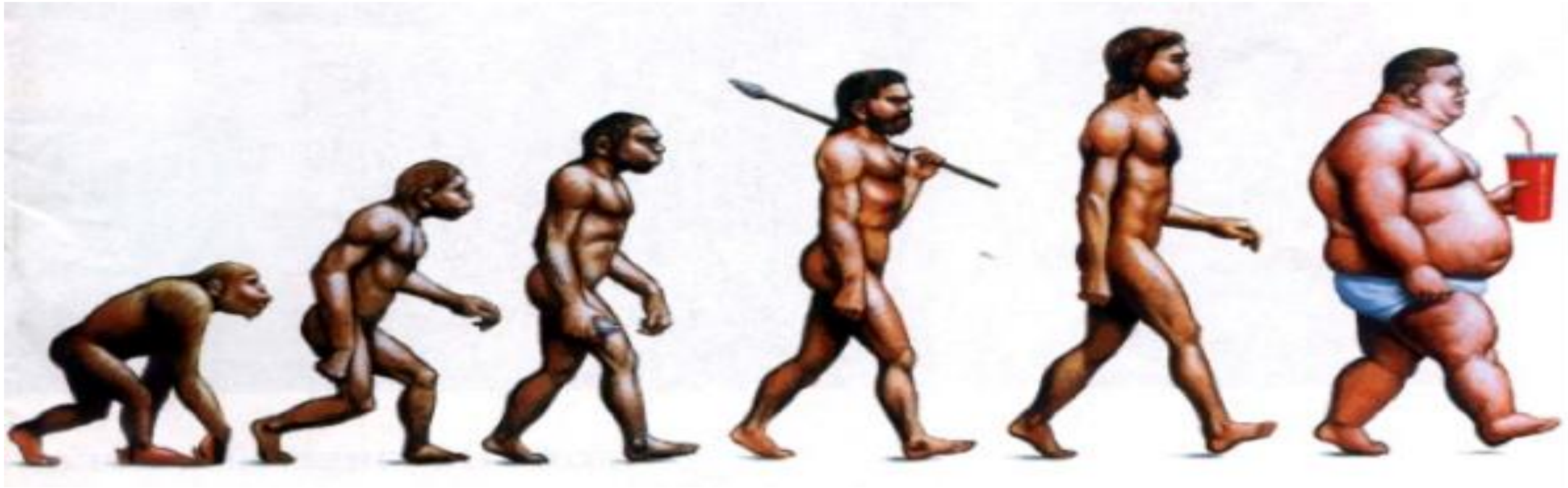
www.thelancet.com

Volume 373 · Number 9676 · Pages 1659–1734 · May 16–22, 2009

"Climate change is the biggest global health threat of the 21st century."


Uxbridge Ealing Shepherds Bush 907
Shepherds Bush

Active Transport



We engineered hygiene into society in the 19th century to overcome infection.

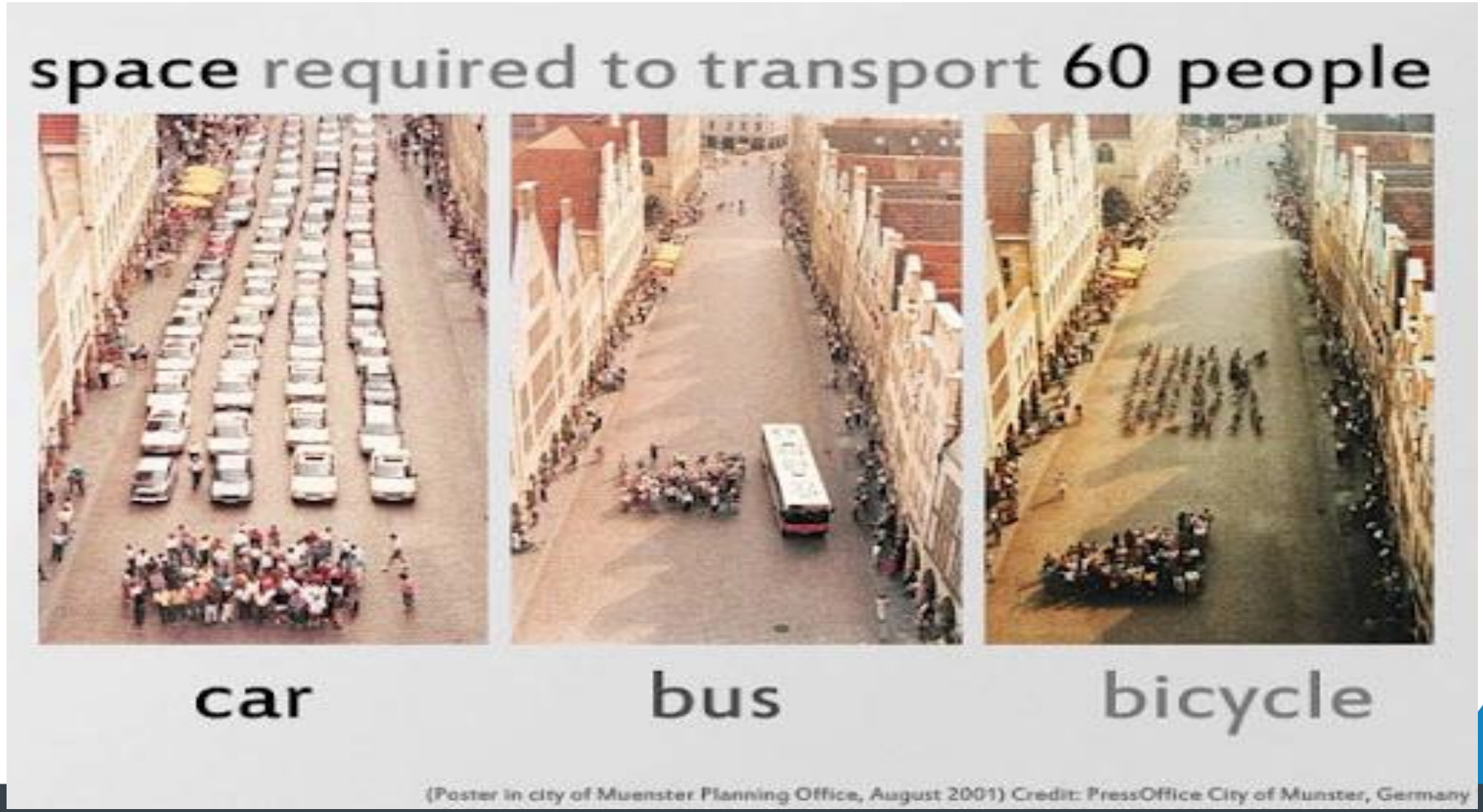
We need to engineer exercise in society in 21st Century to overcome obesity .

Engineer Exercise into Society
– Don’t Compartmentalise / Commoditise it!

Health win-wins (co-benefits) of active travel:

1. more physical activity leads to better health
   - *less obesity/diabetes/heart disease/cancer*
   - *improved mental health*
2. less road trauma
3. improved air quality (PM_{10}, $PM_{2.5}$, NOx, GHG…)
4. more social inclusion / cohesion…


THIS ONE
RUNS ON FAT
AND SAVES YOU MONEY
THIS ONE
RUNS ON MONEY
AND MAKES YOU FAT


space required to transport 60 people
car
bus
bicycle
(Poster in city of Muenster Planning Office, August 2001) Credit: PressOffice City of Munster, Germany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KEEP FOSSIL FUELS IN THE GROUND©


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300210 $
I HAVE BEEN INFORMED FROM A RELIABLE SOURCE, THAT THIS "GLOBAL WARMING" IS JUST NOTHING BUT JUNK SCIENCE!
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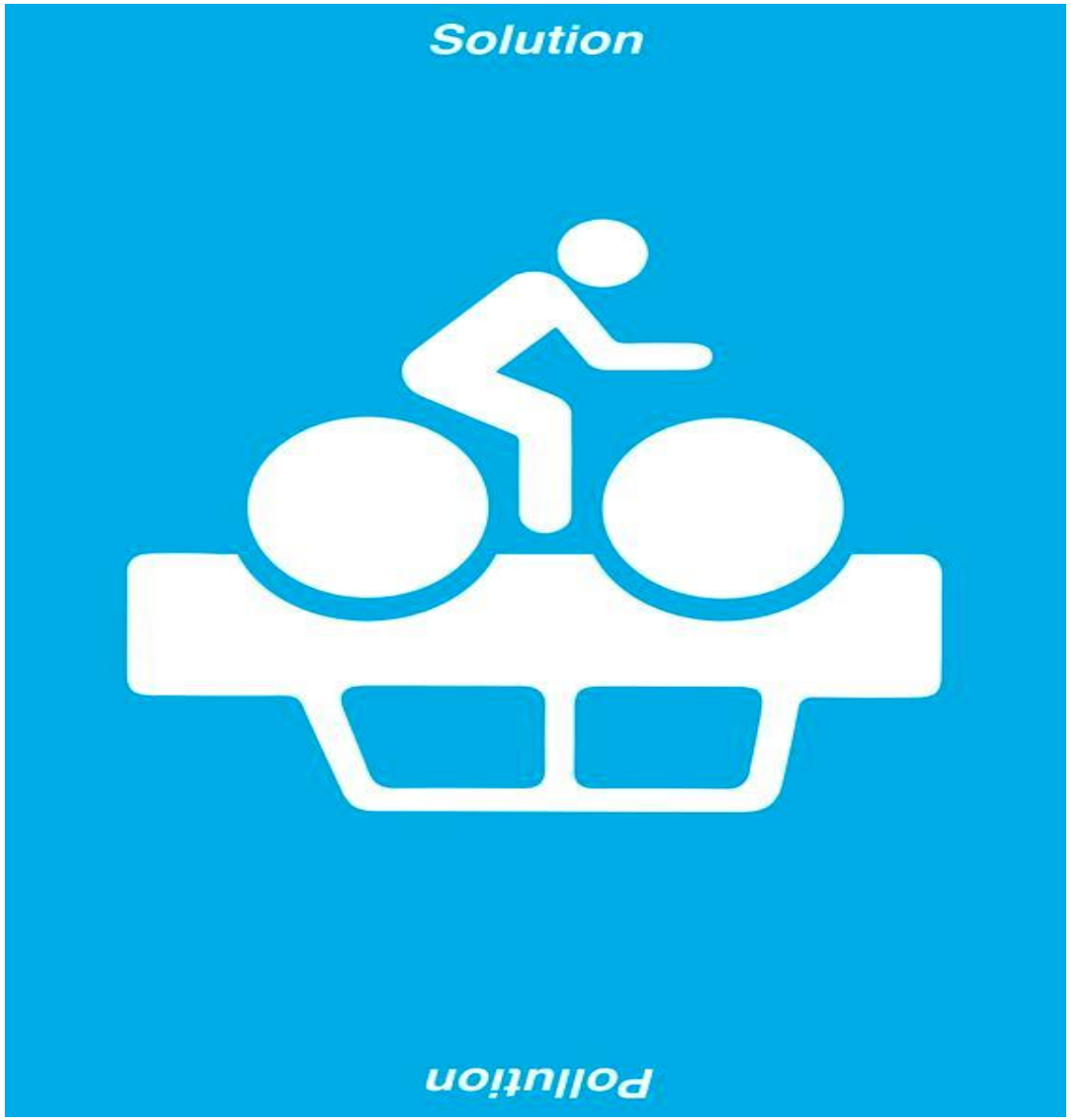
#KeepitintheGround
© Paul Langrock / Greenpeace

The End


Solution
Pollution