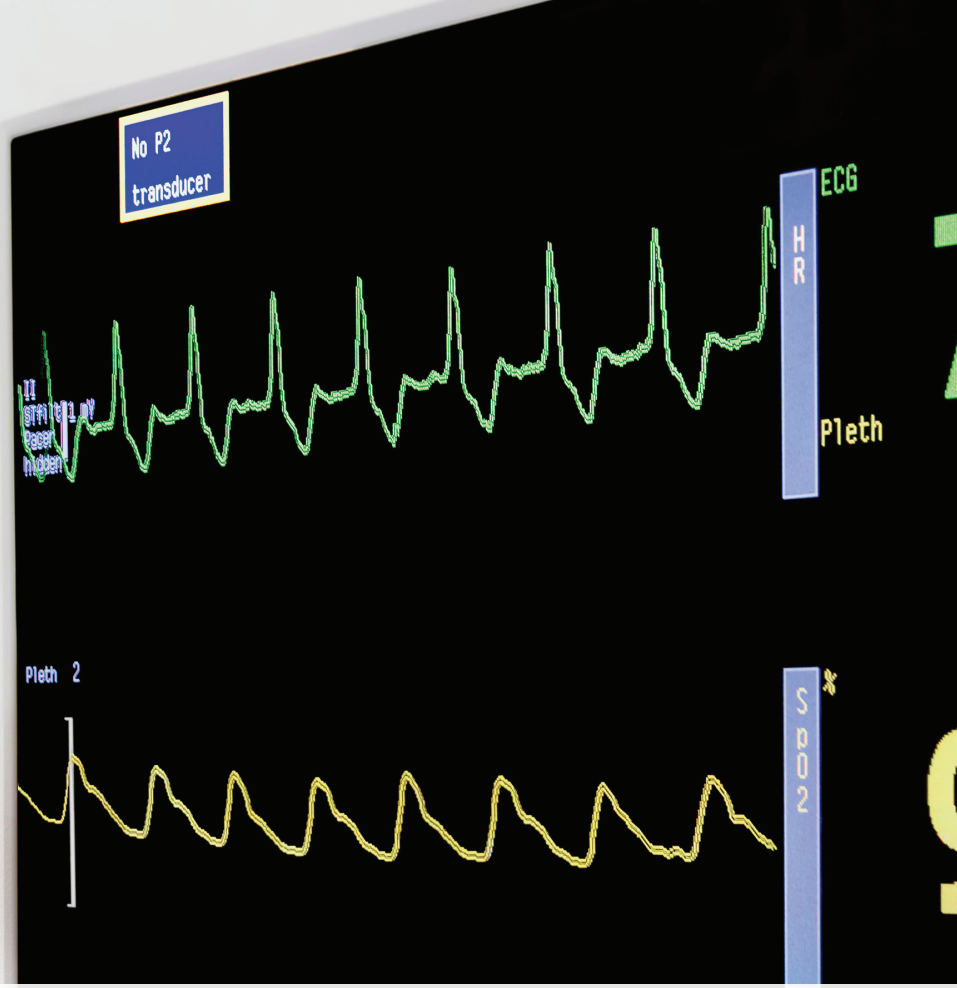


REPORT TO THE CITY OF LONDON HEALTH & WELLBEING BOARD ON AIR POLLUTION

Iarla Kilbane-Dawe PhD (Cantab)
iarla@parhillresearch.com

HOW HAS UNDERSTANDING CHANGED IN RECENT YEARS?

2005

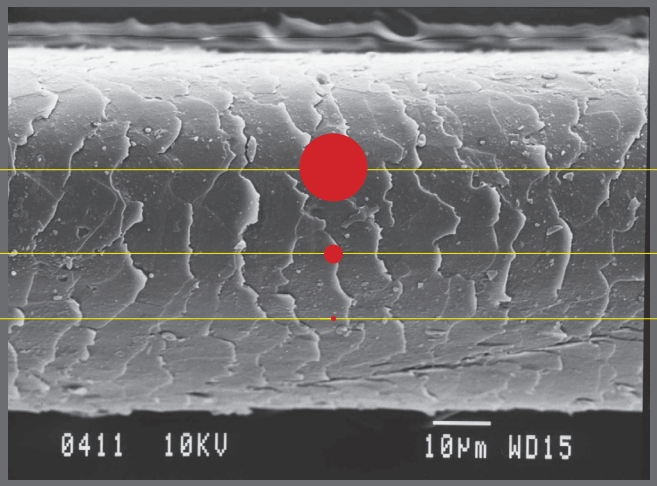
WHEN CURRENT LIMITS WERE SET

PM_{10} particles
From lab and epidemiological studies **thought** to cause respiratory and cardiovascular (CVD) problems. Well measured.

$PM_{2.5}$ particles
Thought to be the best way of quantifying the impacts of the air pollution. An epidemiological study suggested it **could cause 800-8,000 premature deaths in London per year**. Not measured widely.

$PM_{0.1}$ particles
Lab evidence suggests it might be very poisonous to humans. Not measured at all.

NO_x & O_3 gas
O_3 peaks induce asthma. NO_x possibly harmful, but unclear if it's a separate issue to PM.



$PM_{0.1}$ SIZE EXAGGERATED X 10

PM Legal Limits
2½ x limits of the USA. Levels permit a major burden of disease.

Vehicle Air Pollution
Officially listed as a Class 1 carcinogen. Traffic count alone has quantifiable health outcomes.

2013

PM_{10} particles
Certain to cause lung cancer, asthma, bronchitis symptoms especially in the young.

$PM_{2.5}$ particles
Certain to cause CVD, stroke, lung cancer, respiratory disease. PHE estimate it **causes 3,300 premature deaths in London** each year. Poor, children, women affected more. Associated with cognitive impairment, Parkinson's, Alzheimer's, Type II diabetes, adverse birth outcomes.

$PM_{0.1}$ particles
Probable evidence this is the main cause of harm, passing throughout the body and driving system inflammation.

NO_x gas & O_3 gas
Causes respiratory disease at levels found in London and most UK and EU cities. CVD, COPD, diabetes patients more vulnerable.

WHAT IS THE SCALE OF THE PUBLIC HEALTH PROBLEM?

PHOF INDICATOR AS CALIBRATED FOR THE POPULATION OF ENGLAND BY DH	MEAN CUT IN LIFE EXPECTANCY (YEARS)
Premature mortality from cancer	1.7
Premature mortality from CVD	1.4
Excess weight - adults	1.0
Smoking prevalence (over 18s)	0.6
Air pollution, Population vaccination coverage, or Premature mortality from respiratory diseases	0.5
Infant mortality	0.4
Premature mortality of people with mental illness	0.3
Cancer diagnosed at stage 1 and 2, Premature mortality from chronic liver disease, Suicide, Road injuries and deaths, Premature mortality from communicable diseases	0.2
Excess winter deaths, Drug Treatment	0.05
Falls in over 65s	0.04
Smoking at time of delivery, NHS health check	0.02
Under 18 conceptions, Homelessness, Fuel poverty, Child poverty, Failure to breastfeed	≤0.01

PHOF INDICATOR DEATHS PER 100,000 PA RANKED BY LONDON RANKING	AVERAGE OF ALL LONDON BOROUGHS	HACKNEY
4.05i - Cancer ‹ 75	104.9	111.0
4.03 – All preventable causes mortality	104.3	171.7
4.04i - CVD ‹ 75	64.3	86.4
4.05ii - Preventable cancer ‹ 75	60.8	67.3
3.01 - $PM_{2.5}$ (converted to deaths pa/100,000)	**40.6 (5th)**	**33.7 (7th)**
4.04ii - Preventable CVD ‹75	40.2	55.3
1.10 - Road accidents (KSI)	35.3	48.3
4.08 - Communicable diseases (provisional)	31.6	33.1
4.07i - Respiratory disease ‹ 75	22.7	31.3
4.06i - Liver disease ‹ 75	15.7	22.1
4.06ii - Preventable Liver disease ‹ 75	13.4	15.5
4.07ii - Preventable Respiratory disease ‹ 75	11.5	15.1
4.10 - Suicide rate (provisional)	6.9	8.8

Recommendation 1

Ensure that the City's Health & Wellbeing Profile reflects the severity of poor air quality as a public health issue.

HOW MANY PEOPLE ARE AFFECTED? WHO IS AFFECTED?

DH Committee on the Medical Effects of Air Pollution, 2010

COMEAP **speculated** that

> "Average loss of life ranges [from] 11½ years [if PM2.5 caused] 29,000 deaths [per year] to six months [if it affected everyone.] Both extremes are extremely unlikely."

> "It is more reasonable to consider that air pollution may have made some contribution to the earlier deaths of up to 200,000 people in 2008, with an average loss of life of about two years per death affected."

Other new and older evidence

People with cardio-vascular and cardio-pulmonary diseases are the most important affected group.

There is probable evidence that

- People with major respiratory diseases, diabetes
- Children and older people
- People from lower socio-economic groups

are also especially vulnerable.

People who are **especially vulnerable and highly exposed are likely to be affected most**.

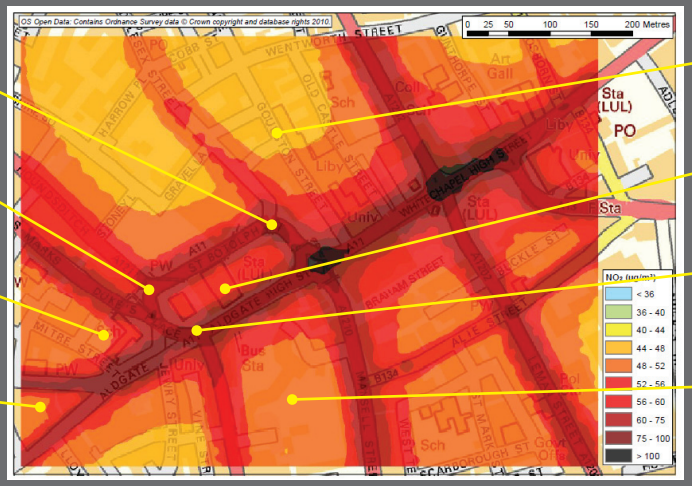
WHAT DO WE RECOMMEND?

Taxi driver working 12 hours daily, 6 days weekly

Street sweeper in planned new mini-park

260 children in passively ventilated school

76,000 people well air-conditioned offices. Some will go out at lunch. Most use the tube to commute.



Cyclist commuting an hour every day

TfL employee standing at Aldgate Station all day.

5,000 pedestrians per hour at peak, though only 600 vehicles

600 residents in public housing, many children, some with health problems. Few elderly.

AIR POLLUTION IS HIGHLY LOCALISED

Exposure increases rapidly with proximity to sources. Exposure is strongly determined by individual's routes or home environment.

R5 – advocate that changes in the urban realm ... are assessed for changes in [resulting] exposure.

R8 – assess the air quality implications of proposal in Area Enhancement Strategies [and rank by public health benefits].

DIRTY VEHICLE MOTORS & FUELS

Diesel is very polluting, but some fuels are cleaner and/or cheaper: petrol, LPG, CNG, EVs. Engine standards proven ineffective, the taxis are especially bad, but quality of evidence is low.

R2 – [influence] neighbouring authorities and the GLA (in particular TfL) so that more action is taken to reduce the public health effects of air pollution.

VEHICLE MOTION

Moving vehicles and heavier vehicles generate PM_{10} by wearing down vehicle parts and road surfaces.

R6 – [air pollution indicators] should be included in the next review of the Local Implementation Plan.

R7 – [as with the Local Plan, conduct a rapid] HIA on the Local Implementation Plan.

INEFFICIENT BUILDINGS & DIRTY HEATING SYSTEMS

Building design often driven by appearance rather than energy efficiency, causing waste. Biomass and CHP systems emit extremely high air pollution levels.

R3 – [reinforce and enforce City] Development Control policies on air pollution.

R4 – [consider how the HWBB can advise on] Development Control policies [as evidence develops].