

Air Pollution and Public Health

(or what are the consequences if the targets are not met)

Professor Frank Kelly

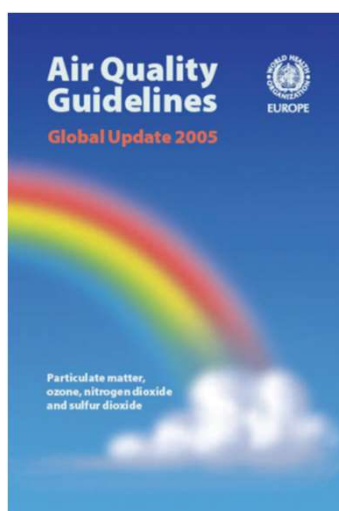
MRC-PHE Centre for Environment & Health King's
College London

The Foundation for Science and Technology
Debate on Urban Air Quality
The Royal Society, 26th April 2017

MRC-PHE
Centre for Environment & Health



Air pollution targets in Europe start with WHO reviewing the health literature



- First published in 1987
- Revised 1997 & 2005
- Systematic review for fourth edition underway
- Scheduled for publication in 2019





COMMITTEE ON THE MEDICAL EFFECTS OF AIR POLLUTANTS

*The Mortality Effects of
Long-Term Exposure to
Particulate Air Pollution
in the United Kingdom*

A report by the
Committee on the
Medical Effects of
Air Pollutants

Published December 2010



*The Mortality Effects of
Long-Term Exposure to
Particulate Air Pollution
in the United Kingdom*

A report by the
Committee on the
Medical Effects of
Air Pollutants

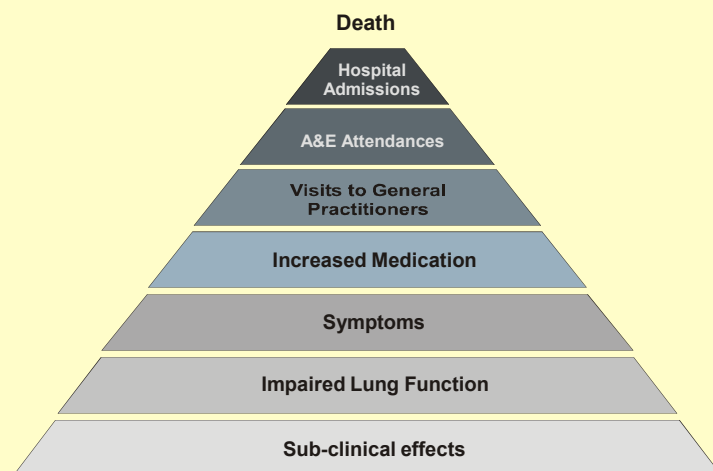


**Across the UK in 2008 poor air
quality measured as PM2.5 was ...**

- associated with a loss of 340,000 life-years across the population
- the average loss of life was 6 months, (although the actual amount varies between individuals, from a few days to many years)
- 'equivalent to' 29,000 premature deaths due to breathing tiny particles

Published December 2010

Impact of air pollution on health

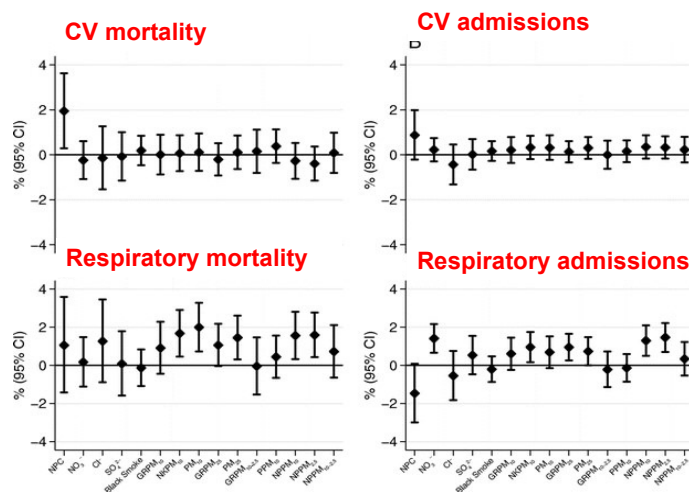


Easter smog episode



London in smog, seen from the edge of Hampstead Heath on Easter weekend, 2011. Photograph: Matt Dunham/AP

Time series studies reveal that pollution episodes are associated with increased health impacts

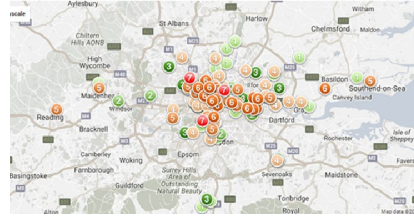


Atkinson et al, 2010

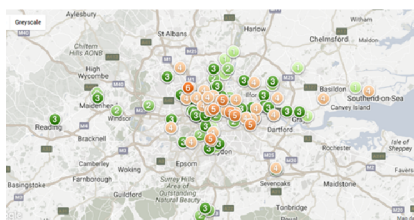
Pollution episodes in 2017



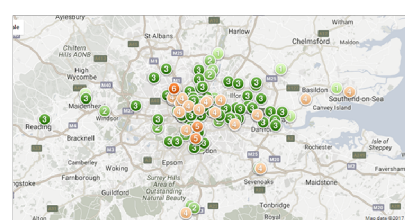
January 20th - 27th



February 10th - 14th



March 27th – 28th



April 8th – 9th

Do we have mechanistic evidence to support the epidemiological findings that link poor air quality with poor health ?

Human - Controlled Diesel Exhaust Exposures



Salvi SS, et al., (1999) *AJCCRM*
 Salvi SS, et al., (2000) *AJCCRM*
 Stenfors N, et al., (2004) *Eur Res J*
 Mudway IS et al., (2004) *Arch Biochem Biophys*
 Pourarzar J et al., (2005) *Am J Physiol*
 Behndig AF et al., (2006) *Eur Res J*
 Pourazar et al, (2008) *Part, Fibre Tox*
 Behndig et al, (2011) *Thorax*



UNIVERSITY OF
Southampton

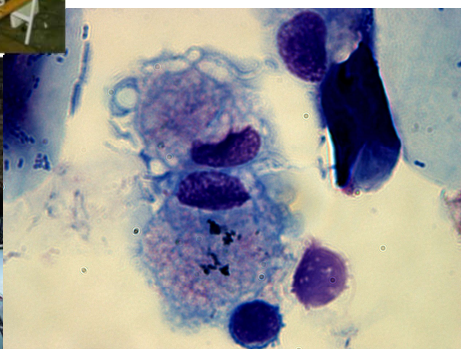
KING'S
College
LONDON

UNIVERSITY OF
SHEFFIELD

Healthy Human - Controlled Diesel Exhaust Exposures



Salvi SS, et al., (1999) *AJCCRM*
 Salvi SS, et al., (2000) *AJCCRM*
 Stenfors N, et al., (2004) *Eur Res J*
 Mudway IS et al., (2004) *Arch Biochem Biophys*
 Pourarzar J et al., (2005) *Am J Physiol*
 Behndig AF et al., (2006) *Eur Res J*

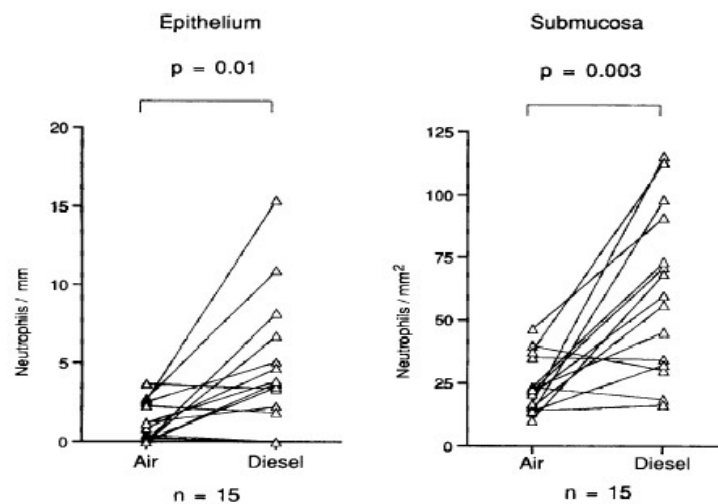


UNIVERSITY OF
Southampton

KING'S
College
LONDON

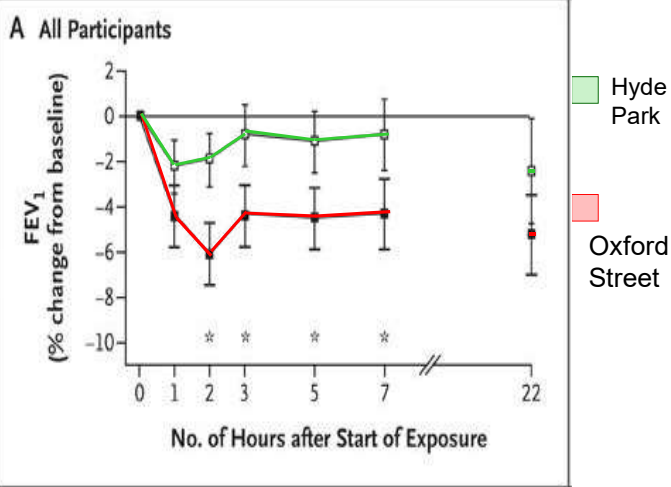
UNIVERSITY OF
SHEFFIELD

Pulmonary inflammatory responses to DE

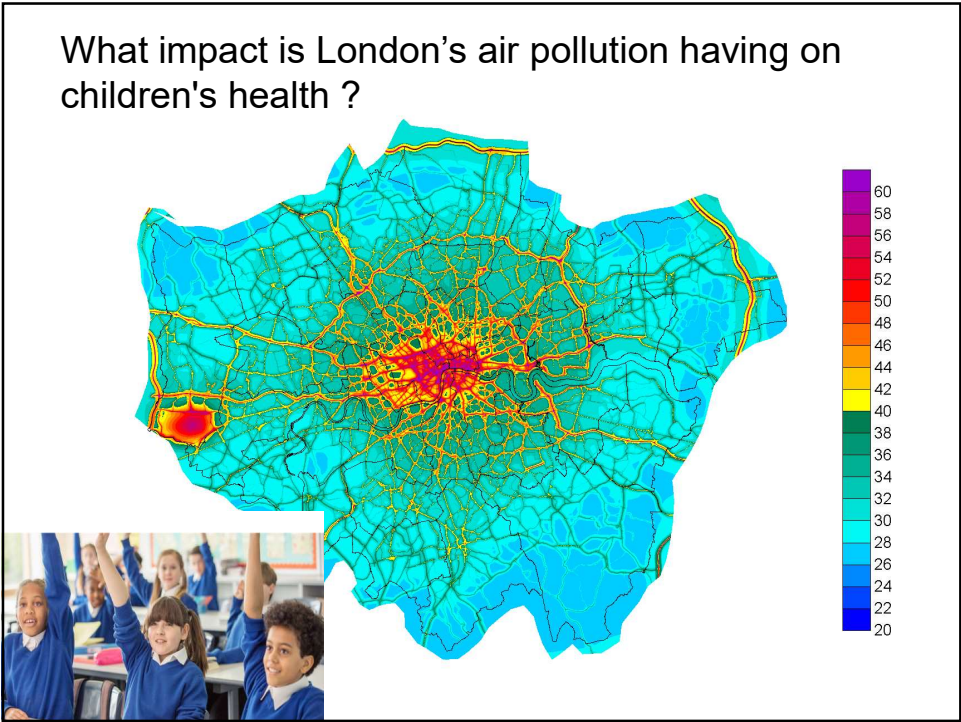
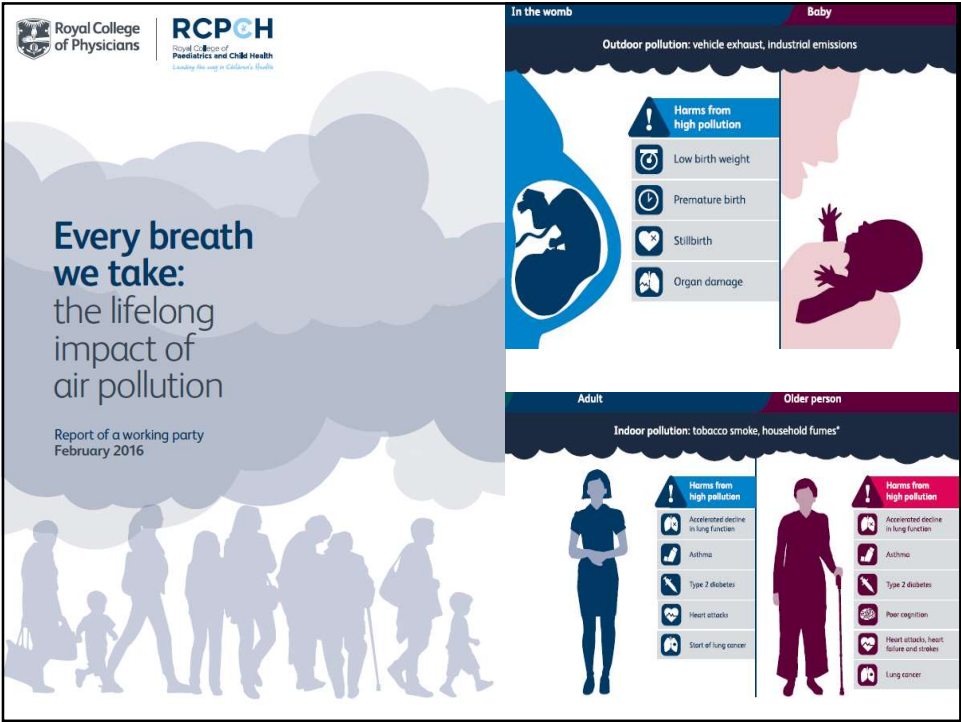


Salvi et al, Am J Resp Crit Care Med

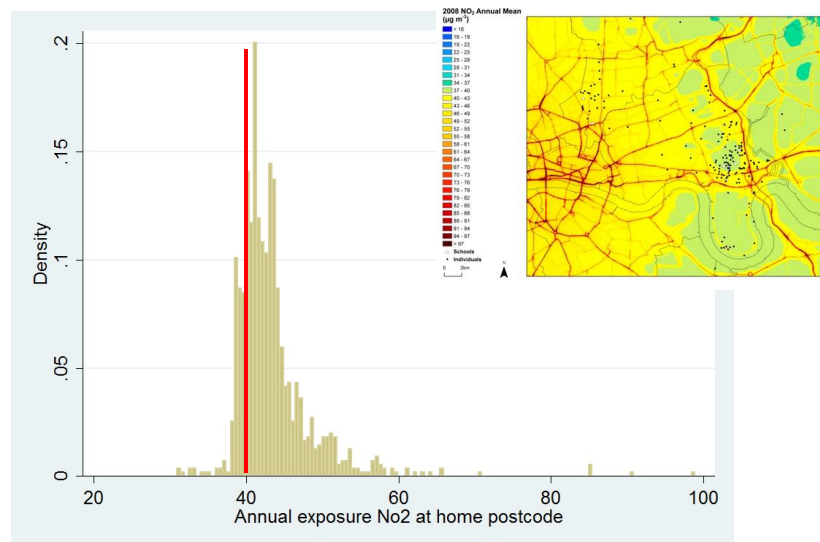
Short term exposure to real world atmospheres (diesel traffic) cause respiratory effects in asthmatics



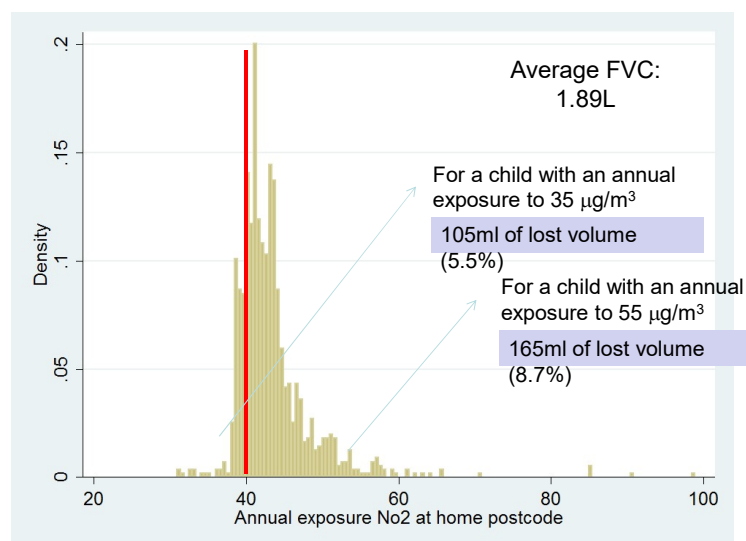
Mc Creanor et al, NEJM, 2007

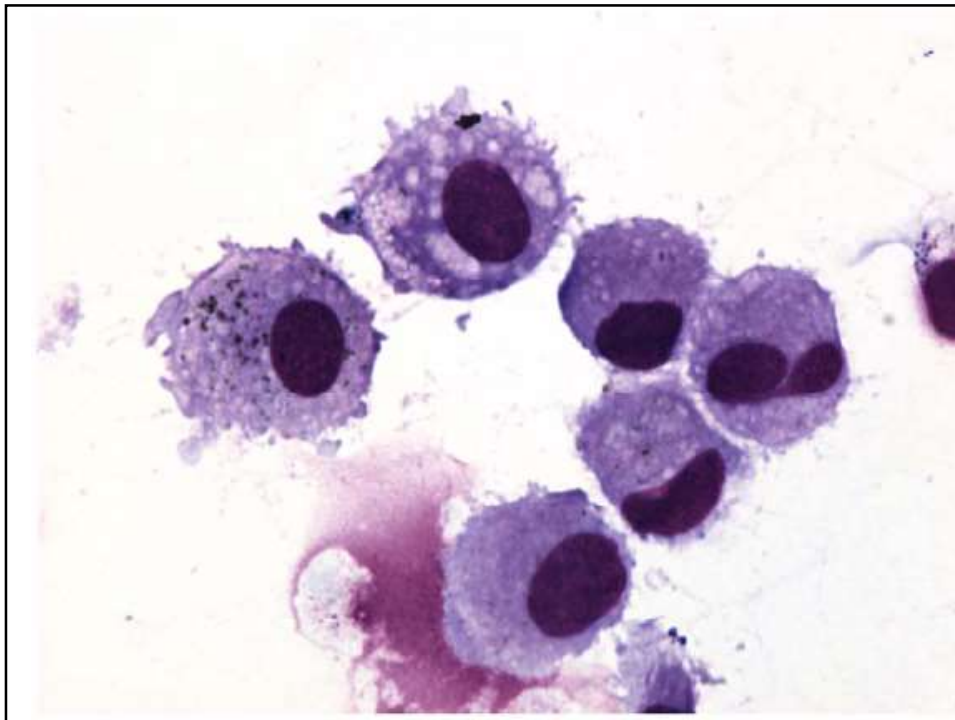


Children's exposure to NO₂ in East London



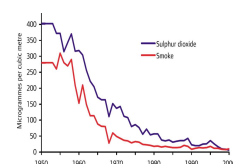
Adverse impact on lung growth





In summary.....

- Evidence base linking poor air quality and poor health is diverse and extensive
- We all contribute to the problem !
 - either through driving in urban areas, taking a taxi after this meeting or lighting our wood burning stove at the weekend
- The 1956 Clean Air Act worked – we can solve this new problem



Thanks for listening

MRC-PHE
Centre for Environment & Health

Public Health
England

MRC

Imperial College
London

KINGS
COLLEGE
LONDON

