

Air Pollution and the HPA



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Air Pollution Unit

Kent and Medway AQ Partnership 14 Oct 2010



The **Health Protection Agency's** role is to provide an integrated approach to **protecting UK public health** through the provision of **support and advice** to the NHS, local authorities, emergency services, other arms length bodies, the Department of Health and the devolved administrations.

Who we are



Local and Regional Services:

- 26 Health Protection Units in England
- 9 Regional Offices

Centre for Radiation, Chemical and Environmental Hazards

- 4 Supra-regional offices
- National HQ (Air Pollution Unit)

A brief history of air pollution and health in the UK



Alkali Acts – (1st Act 1860s)

- Initially applied only to chemicals industry, then expanded
- Driven by effects on land (crops)



J.M.W. Turner, *Rain, Steam, and Great Central Railway*, 1844-45
Oil on paper, 100 x 150 mm
Private Collection

ERW
L
C.W.S

GORDON'S
THE HEART
OF A GOOD COCKTAIL

VERMOUTH

WRIGLEYS
CHEWING GUM
REFRESHING

col of Hairdressing

STAR

ROZOR
NEEDS NO DRYING

RONSON

BERTRAM
CIRCI

GINZA

B-D-A-C
B-D-A-C

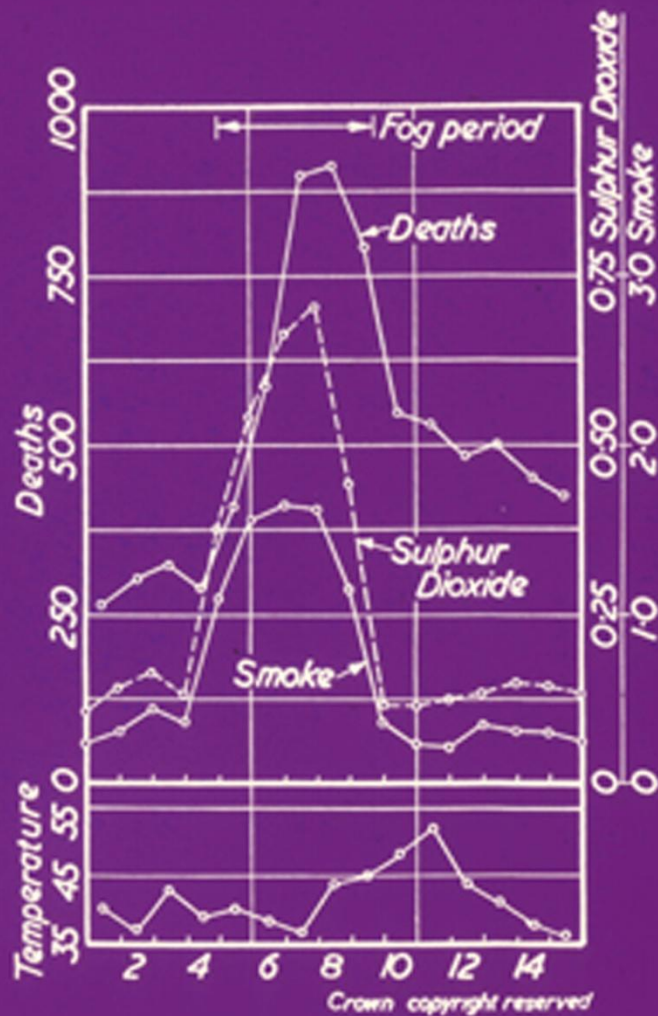


FIG. 11.3. Deaths, air pollution and temperature during December, 1952, in Greater London

(Interim Report of Committee on Air Pollution, 1953)

Units: Sulphur dioxide, p.p.m; smoke, mg/m³; temperature, °F.

1950s:

- Clean Air Act 1956 – domestic coal fires and industry
- MRC Group for Research on Atmospheric Pollution (later the Air Pollution Research Unit)

1960s:

- Air became visibly cleaner

1980s:

- Concern about different sources of pollution (traffic)
- Concern about ozone episodes

1990 – MAAPE set up

1992 – COMEAP established

EPAQS

- Recommended AQ Standards for O₃, PM, SO₂, NO₂, CO, PAHs, Pb, benzene, 1,3-butadiene

DH-funded research programme

2006 – Air Pollution Unit transferred to the HPA

1998

DEPARTMENT OF HEALTH



Committee on the Medical Effects
of Air Pollutants

**Quantification of the
Effects of Air Pollution on
Health in the United Kingdom**

Relate daily variations in air pollution to effects on health

- Mortality
- Hospital admissions for respiratory conditions

Allowed COMEAP to

- Recommended effects coefficients
- Calculate annual:

Deaths brought forward (urban areas) : approx 11,500

Additional hospital admissions (urban areas) : approx 14,000

Deaths brought forward (O_3) : approx 700 – 12,500

Additional hospital admissions (O_3) : approx 500 – 10,000

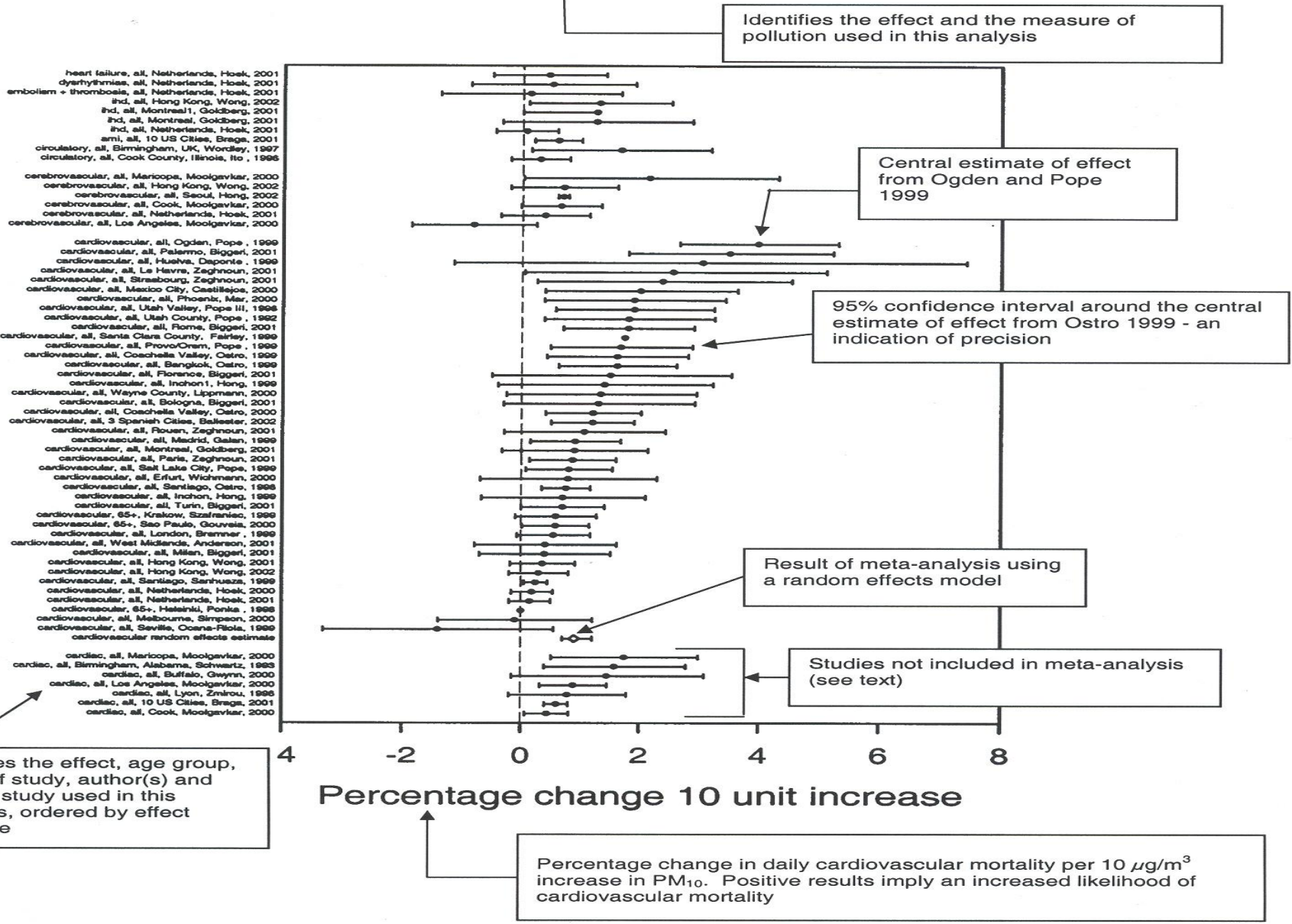
2006



*Cardiovascular Disease and
Air Pollution*

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

Cardiovascular mortality and PM₁₀



2006,
2009



COMMITTEE ON THE MEDICAL EFFECTS OF AIR POLLUTANTS



Long-Term Exposure to Air Pollution: Effect on Mortality

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

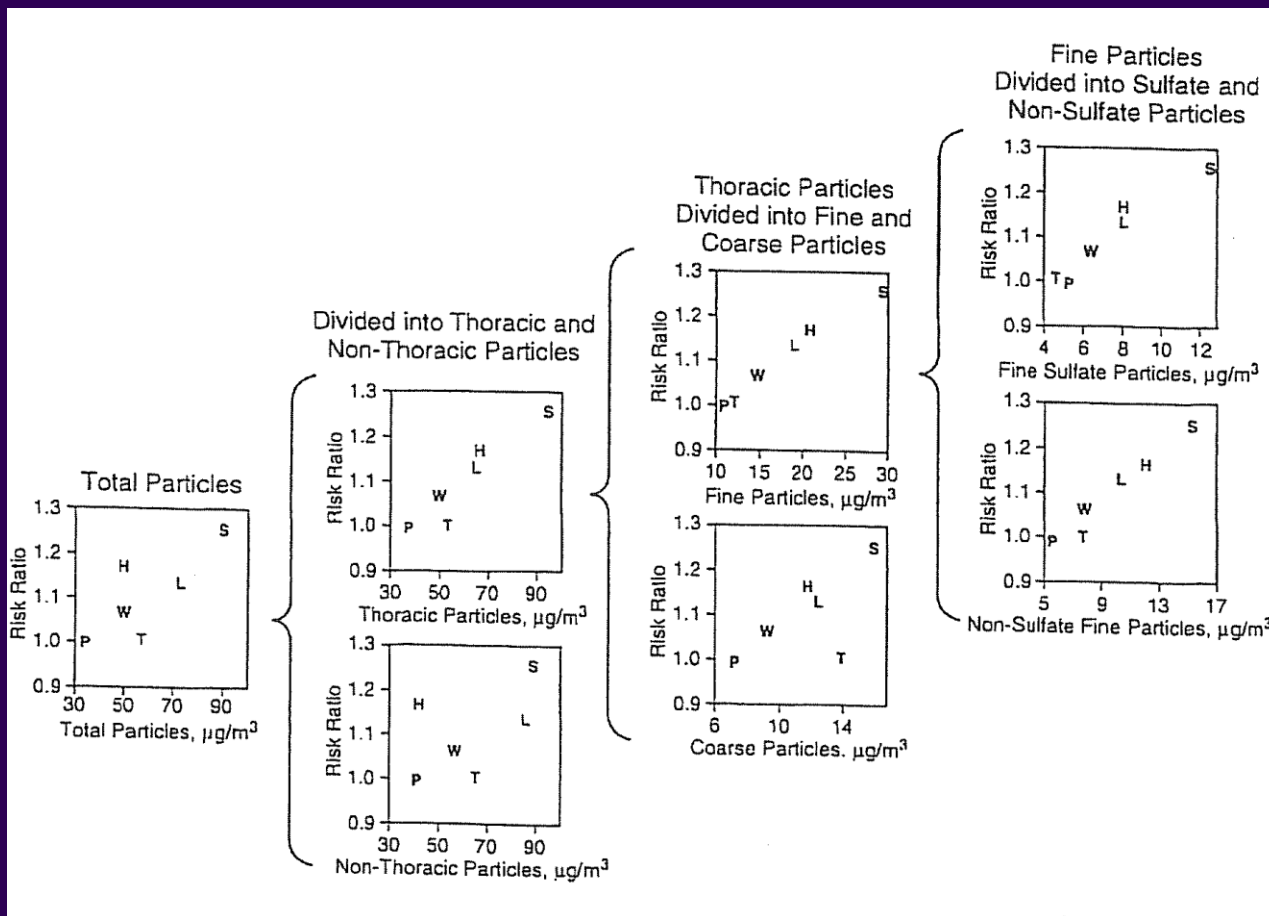
Comparisons of mortality rates in different cities -
i.e. populations with different *long term* air pollution
histories

Relate mortality rates to ambient air quality measurements

- All-cause mortality
- Cardio-pulmonary mortality
- Lung cancer mortality

Six Cities Study

(Lippmann 1998)



P= Portage, Wisconsin; T= Topeka, Kansas; W= Watertown, Massachusetts; L= St Louis, Missouri; H= Harriman, Tennessee; and S= Steubenville, Ohio.

COMEAP recommended use of increase in risk reported in an analysis of the ACS study data (*Pope et al (2002) JAMA. 287(9):1132-1141*) as a coefficient for quantification of long-term impacts of air pollution:

- 6% increase in risk of all-cause mortality per $10\mu\text{g}/\text{m}^3$ $\text{PM}_{2.5}$

2007



The Air Quality Strategy for England, Scotland, Wales and Northern Ireland

Volume 2



Department for Environment, Food and Rural Affairs in partnership with the
Scottish Executive, Welsh Assembly Government and Department of
the Environment Northern Ireland



2010

www.defra.gov.uk



Air Pollution: Action in a Changing Climate



March 2010



Advice

- The health effects of air pollutants (2000)

Guidance

- The effects on health of indoor air pollutants (2004)

Statements

- Use of substitute fuels in cement kilns (2009)

Asthma

- Does air pollution cause asthma as well as aggravating it?

QUARK II

- Quantifying the effects of air pollution
 - long-term effects of PM_{2.5}

COMEAP Standards Advisory Subgroup (CSAS)

- Review of the air quality index and pollution bands

Current UK AQI



Band	Index	Ozone		Nitrogen Dioxide		Sulphur Dioxide		Carbon Monoxide		PM10 Particles	
		Running 8 hourly or hourly mean*		hourly mean		15 minute mean		Running 8 hourly mean		Running 24 hour mean	
		$\mu\text{g m}^{-3}$	ppb	$\mu\text{g m}^{-3}$	ppb	$\mu\text{g m}^{-3}$	ppb	mg m^{-3}	ppm	$\mu\text{g m}^{-3}$ (Grav. Equiv.)	$\mu\text{g m}^{-3}$ (Ref. Equiv.)
Low											
	1	0-33	0-16	0-95	0-49	0-88	0-32	0-3.8	0.0-3.2	0-21	0-19
	2	34-65	17-32	96-190	50-99	89-176	33-66	3.9-7.6	3.3-6.6	22-42	20-40
	3	66-99	33-49	191-286	100-149	177-265	67-99	7.7-11.5	6.7-9.9	43-64	41-62
Moderate											
	4	100-125	50-62	287-381	150-199	266-354	100-132	11.6-13.4	10.0-11.5	65-74	63-72
	5	126-153	63-76	382-477	200-249	355-442	133-166	13.5-15.4	11.6-13.2	75-86	73-84
	6	154-179	77-89	478-572	250-299	443-531	167-199	15.5-17.3	13.3-14.9	87-96	85-94
High											
	7	180-239	90-119	573-635	300-332	532-708	200-266	17.4-19.2	15.0-16.5	97-107	95-105
	8	240-299	120-149	636-700	333-366	709-886	267-332	19.3-21.2	16.6-18.2	108-118	106-116
	9	300-359	150-179	701-763	367-399	887-1063	333-399	21.3-23.1	18.3-19.9	119-129	117-127
Very High											
	10	360 or more	180 or more	764 or more	400 or more	1064 or more	400 or more	23.2 or more	20 or more	130 or more	128 or more

Banding	Index	Health Descriptor
Low	1, 2, or 3	Effects are unlikely to be noticed even by individuals who know they are sensitive to air pollutants
Moderate	4, 5, or 6	Mild effects, unlikely to require action, may be noticed amongst sensitive individuals.
High	7, 8, or 9	Significant effects may be noticed by sensitive individuals and action to avoid or reduce these effects may be needed (e.g. reducing exposure by spending less time in polluted areas outdoors). Asthmatics will find that their 'reliever' inhaler is likely to reverse the effects on the lung.
Very High	10	The effects on sensitive individuals described for 'High' levels of pollution may worsen.

Strategic/national:

- Scientific Secretariat to COMEAP and its subgroups
- Scientific advice to OGDs including DH and Defra
- Collaborative research on climate change impacts

Reactive/operational

- Advice during incidents (e.g. volcanic ash)
- Advice via supra-regional CRCE Units to HPUs, PCTs, LAs

CRCE South East Supra-regional Unit, London

Health Protection Agency Central Office
7th Floor Holborn Gate, 330 High Holborn
London WC1V 7PP

Tel: 020 7759 2871

Email chemicals.london@hpa.org.uk

Kent Health Protection Unit

Preston Hall, Aylesford, Kent, ME20 7NJ

Tel: 01622 710161

Email: HPU-Kent@hpa.org.uk

Thank you