

Update: 4 December 2022

Great Smog's 70th anniversary – Take action!

70 years ago, people were worried about respiratory effects from short term exposure to visible particles from solid fuel burning.

On the eve of the 70th anniversary of the Great Smog (5-9 December 1952), Clean Air in London (CAL) has therefore looked back at the Meteorology Office's ("Met Office's") Daily Weather Reports ("DWR"), headlines in The Times, Parliament's response and subsequent scientific research to draw lessons for the future. The greatest lesson is to 'Take action'!

New estimates suggest that long term exposure to nitrogen dioxide (NO₂) and particulate matter (PM_{2.5}) was responsible for between 29,000 to 43,000 premature deaths for adults aged 30 and over in the UK in 2019¹.

Air pollution is still the world's largest environmental health risk killing an estimated seven million people a year. It can affect everyone to some extent at every stage of their life².

The Meteorology Office ("Met Office"): Smoke fog ("smog")

The weather in November and early December 1952 was very cold with snowfalls across much of England and Wales.

On 3 December 1952, the Met Office's DWR forecast³ was "Tonight keen frost will occur in most inland and western areas. Smoke fog will develop near large towns with fog patches elsewhere."

To keep warm, Londoners were burning large quantities of coal in their homes. Smoke was pouring from chimneys and people probably made special efforts to replenish stocks. Under normal conditions, the smoke would rise into the atmosphere and disperse. However, a high pressure system was centred over the Irish Sea by Thursday 4 December 1952 and slowly drifted south east over the next few days. By early on Friday 5 December the sky was clear over London, winds were light and the air near the ground was moist. This resulted in a temperature inversion which formed a layer of fog 100-200 metres deep.

During the Great Smog of London, some 800 tonnes a day of sulphuric acid and other deadly pollutants were created or emitted each day between 5-9 December 1952. These pollutants killed an estimated 4,000 people within a few days and up to another 8,000 in subsequent months⁴. An additional 25,000 people in Inner London alone claimed sickness benefit during December 1952 than during December 1951⁵.

It was easy to assess the health impacts by measuring air pollution and counting 'excess' registered deaths or illnesses in the days and weeks after an air pollution episode.

¹ https://cleanair.london/app/uploads/CAL-490-CHaPR_AQ_Special_Edition_2206116_Deaths-in-2019.pdf

² <https://www.gov.uk/government/publications/health-matters-air-pollution/health-matters-air-pollution>

³ <https://twitter.com/cleanairlondon/status/1595087118023499777?s=61&t=IvYP1Sn9fIKeHlph2VoQwQ>

⁴ <https://pubmed.ncbi.nlm.nih.gov/14698923/>

⁵ <https://www.theyworkforyou.com/debates/?id=1953-02-09a.7.0#g7.1>

Quotes

Simon Birkett, Founder and Director of Clean Air in London, said:

“Air pollution is still the world’s largest environmental health risk 70 years after the Great Smog, killing an estimated seven million people every year. Clean Air in London (“CAL”) has looked back at the evidence and found that the greatest lesson is to ‘Take action’!

“CAL fully supports therefore Baroness Jenny Jones’ Clean Air (Human Rights) Bill⁶, known as Ella’s Law⁷, as it heads to the House of Commons after being approved by the House of Lords on Friday 2 December 2022. I am pleased to be advising Baroness Jones and Caroline Lucas MP on this Bill which has strong support from leading experts, NGOs, the general public and across the political spectrum.

“This Bill would transform the quality and speed of decision making by the Government and all public authorities overnight by enshrining the human right to clean air precisely and explicitly in England and Wales law. This simple change would put air pollution and climate action on par with equalities.

“We urge the Government to back Ella’s Law and this Bill as a previous Government backed Sir Gerald Nabarro’s (Conservative) Clean Air Bill in 1955 and 1956. The Environment Act 2021’s limp amendments to the Clean Air Act 1993 have achieved nothing. In contrast, the first Clean Air Act 1956 spurred innovation and created a healthier, happier and fairer society. It made us a world leader for many years.

“We need Ella’s Law before the 10th anniversary of Ella Roberta Adoo Kissi-Debrah’s death on 15 February 2023.”

The Times newspaper headlines and photos

The Times newspaper’s headlines and stories from 70 years ago and subsequently included:

- Friday 5 December 1952 – Weather forecast. London: Light variable wind; widespread fog at first, persisting all day in places; midday temperature 35-40 degrees; frost early and late. Further outlook: Mild and cloudy weather spreading gradually to all part of the country.
- Saturday 6 December 1952 – Fog holds up London traffic; and Fog delays air services.
- Monday 8 December 1952 – Unbroken frost; Transport dislocated by three days of fog; London buses stopped; Cars abandoned; League programme curtailed; University match postponed; and Show cattle affected (including “Veterinary officials worked on Saturday and yesterday treating animals which appeared to have contracted respiratory troubles either on their long journeys or in the fog-filled hall. An Aberdeen Angus entry died.”).
- Tuesday 9 December 1952 – The Times’s front page showed photo titled “On the edge of the fog belt”; More deaths at [Smithfield] Cattle Show; and that there had been chaos again in the fog and many road crashes.
- Wednesday 17 December 1952 – London fog deaths. Mr Driberg MP asked the Minister of Health how many persons died from bronchial or other ailments in the Greater London areas as a result of the recent severe fog. Mr Macleod in a written reply states: “Separate figures for deaths from respiratory diseases and total deaths during last week in the greater London area are not yet available

⁶ <https://bills.parliament.uk/bills/3161>

⁷ <https://cleanair.london/ellaslaw/>

but the number of deaths from all causes in that area for the week ended December 6 was 2,062 compared with 1,543 in the corresponding week last year.”

- Saturday 20 December 1952 – Inquiry into London fog suggested by the National Smoke Abatement Society similar to that undertaken by the federal and state governments after the fog in Donora, Pennsylvania in 1948. The article said: “It was announced on Thursday [18 December] that deaths from all causes in Greater London during the week ended December 13 totalled 4,703 compared with 1,852 in the corresponding week of 1951”.
- 31 January 1953 – Death rate in London fog – Tenfold increase in bronchitis. Worse than 1873. “The increase in deaths was associated almost entirely with disorders of the circulatory or respiratory systems. Compared with the average a week in the previous three weeks, deaths from bronchitis in the week ended December 13 [1952] were 10 times as many, from influenza seven times as many, from pneumonia nearly five times as many, from pulmonary tuberculosis four and a half times as many and from other respiratory diseases nearly six times as many. From cancer of the lung, they rose rather less to nearly twice as many; from disorders of the heart and the circulatory system they were nearly three times as many.” “Among children aged four weeks to a year and among persons aged over 55 three times as many deaths were registered in the week ended December 13 as could be expected from the figures for the previous three weeks and among persons of all other ages rather over twice as many.” Report to be submitted to the London County Council on Tuesday [3 February 1953].
- 26 November 1954 – “Clean Air Act” urged by Beaver Committee [on 25 November 1954]: Smoke penalties proposed; Smokeless Zones – Increase recommended, “Radical changes” entailed; National policy – looking five years ahead; Power stations – New equipment needed; and Plea for research – Formation of Council.

Parliament demanded answers and action

Members of Parliament wanted answers. Marcus Lipton MP asked the Minister of Health about the 4,703 deaths in the Greater London area in the week ending 13 December 1952 as compared with 1,852 during the corresponding week of 1951⁸.

Norman Dodds MP asked Harold McMillan MP, Minister, on 27 January 1953 about “Local Government: Atmospheric pollution”⁹.

The City of London Corporation was the first to take action with the City of London (Various Powers) Bill which had its Second Reading on 10 March 1954¹⁰ and received Royal Assent on 5 July 1954¹¹. This law required that “No smoke should be emitted from premises in the City of London.”¹²

The Government established the Committee on Air Pollution chaired by Sir Hugh Beaver (“Beaver Committee”) on 21 July 1953¹³ “To examine the nature, causes and effects of air pollution and the efficacy of present preventive measures; to consider what further preventive measures are practicable; and to make recommendations.” It published an interim report on 2 December 1953¹⁴ and a final report on 25 November 1954. Sir Gerald Nabarro MP asked Duncan (later Lord) Sandys MP, Minister of

⁸ <https://www.theyworkforyou.com/debates/?id=1953-01-22a.382.1#g382.2>

⁹ <https://www.theyworkforyou.com/debates/?id=1953-01-27a.828.3#g828.4>

¹⁰ <https://www.theyworkforyou.com/debates/?id=1954-03-10a.2306.1#g2306.2>

¹¹ <https://www.theyworkforyou.com/debates/?id=1954-07-05a.1831.0#g1831.1>

¹² https://cleanair.london/app/uploads/City-of-London_VP_Act-1954-2.pdf

¹³ <https://www.theyworkforyou.com/debates/?id=1953-07-21a.201.3#g201.4>

¹⁴ <https://www.theyworkforyou.com/debates/?id=1953-12-02a.1160.2#g1160.3>

Housing and Local Government, to make a statement on the policy of the government in connection with the recommendations of the Beaver Committee report on 25 January 1955¹⁵.

The Beaver Committee's five principal recommendations were:

1. That, subject to certain exceptions, the emission of dark smoke should be prohibited by law.
2. That industries, when installing new plant, should be required to take all practical steps to prevent the emission of grit and dust.
3. That, subject to confirmation by the Government, local authorities should be empowered to designate "Smokeless Zones" and "Smoke Control Areas".
4. That the duty of inspection and enforcement should be placed upon local authorities, except in the case of certain industrial processes, which should be supervised by Government Inspectors.
5. That householders in smoke restricted districts should be required to burn only smokeless fuel and the cost of converting domestic fireplaces should be met, to a large extent by grants from the Exchequer and the local authorities.

Sir Gerald Nabarro MP's (Conservative) Clean Air Bill won first place in the Private Members Ballot in the House of Commons in the final session of the 1954/1955 Parliament. The purpose of the Bill was to implement the principal recommendations of the Beaver Committee. The Clean Air Bill reached Second Reading on 4 February 1955¹⁶ before being withdrawn after receiving an assurance from the Government that it would bring in comprehensive legislation on the subject during the last session of Parliament. However, a General Election intervened on 25 May 1955. Sir Gerald Nabarro spoke about it again in the Debate on the Queen's Speech on 13 June 1955¹⁷.

The Second Reading of the new Clean Air Bill took place on 3 November 1955¹⁸. Report and Third Reading of the Bill took place on 10 April 1956. The Clean Air Act 1956 received Royal Assent on 5 July 1956.

Scientific research

One of the recommendations of the Beaver Committee was to "Commission research" into the sources and the health impact of various pollutants and to take airborne measurements.

The Medical Research Council Air Pollution Unit at St Bartholomew's Hospital opened in 1955. The Unit was directed by Professor Pat Lawther. The Unit focused on respiratory impacts. By the mid-to-late 1970s, the Holland report (1979) suggested that the problem had been solved (pages 47 and 105). The Unit closed in 1980.

Simon Birkett was one of 16 people who participated in the Wellcome Trust's Witness Seminar on 'Air pollution research in Britain c1955-c2000' on 19 May 2015¹⁹. Selected extracts offer insights into the Great Smog and subsequent developments in the understanding of air pollution:

¹⁵ <https://www.theyworkforyou.com/debates/?id=1955-01-25a.38.2#g38.3>

¹⁶ <https://www.theyworkforyou.com/debates/?id=1955-02-04a.1422.0#g1422.1>

¹⁷ <https://www.theyworkforyou.com/debates/?id=1955-06-13a.291.1#g308.4>

¹⁸ <https://www.theyworkforyou.com/debates/?id=1955-11-03a.1221.0&s=%22clean+Air+Bill%22>

¹⁹ https://cleanair.london/app/uploads/CAL-490-Wellcome-Witness-Seminar_Air-pollution-research-in-Britain-1956-c2000_2016.pdf

Professor Maynard: *“The impression I got...was that Pat [Lawther] himself was quite convinced that the great problem that he’d been given had been dealt with. It wasn’t that he thought that all air pollution problems had been dealt with; that was slightly different. He thought that the great problem that he’d been given, and that was the high sulphur dioxide; high particle concentrations; coal smoke; the London smog problem, that’s what he thought he’d been asked to sort out, and he thought his team had sorted it out. That’s where he got to. Then, when I used to ask him, ‘What do you think about what’s happened since?’ he used to say, ‘Well, that’s different; that’s not the same problem.’”* Page 50.

Professor Maynard: *“We agreed to differ on many things but I agree with him that he had driven the sulphur dioxide and particles problem into submission as far as her could using the techniques at the time. Not everybody would have agreed with him, and certainly Morton Lippmann in the States would have said that he had not used the modern techniques of multiple regression analysis, which were available for looking at the time-series work. Morton would have been critical about that, and still is critical about it, but that at least was Pat’s view.”* Page 51.

Professor Jonathan Grigg: *“With hindsight, the closure of the Unit as a missed opportunity to refocus UK research on the modern pollution mix. But by the 1970s, the appetite for new air pollution research had faded as “The feeling was that the problem was over... It wasn’t worth pursuing any further.” There was a quiet time for air pollution research from 1965 to 1990. It is wrong for scientists to take their brief too literally.* Page xiii.

Professor Richard Derwent: *“This all culminated, in 1990, in the first environment White Paper, This Common Inheritance...”*

Notes: This Common Inheritance²⁰ was followed by annual progress reports, and the Government’s policies on air pollution were set out in Air Quality: meeting the challenge; the Government’s strategic policies for air quality management; see Department of the Environment (1990, 1995).

Scientists in the USA published a landmark study on 9 December 1993 titled “An association between Air Pollution and Mortality in Six U.S. Cities”. It concluded that “Although the effects of other, unmeasured factors cannot be excluded with certainty, these results suggest that fine particulate air pollution, or a more complex mixture associated with fine particulate matter, contributes to excess mortality in certain U.S. cities”.

Professor Anthony Seaton: *“Maybe I ought to say a little bit about this because I remember it so well. It was a COMEAP²¹ meeting and we were arguing, and I talked about the cardiac effects apparently in the epidemiology. I think Mr Waller was there and being sceptical, saying it was, I’m not sure, but someone was saying, almost certainly confounding. I went home puzzling over it, and I got home and it was a Friday and The Lancet had arrived in my mail that day. I just picked it up and looked through it and there was a paper in it by Kay Tee Khaw, who was Professor of Clinical Gerontology in Cambridge, on seasonal changes in fibrinogen, which she thought might be due to seasonal infections or something, that allowed for temperature. I just suddenly thought, ‘That’s it! It’s air pollution that is changing fibrinogen. Fibrinogen makes the blood clot and blood clots cause heart attacks.’ I thought that and then I thought, ‘It’s such a small dose.’ By about 2am that night, not being able to sleep thinking about it, I, of course, remembered Günter Oberdörster’s work on particulate air pollution [1992], which hasn’t been mentioned yet but which was absolutely important to understanding air pollution, showing*

²⁰ <https://cleanair.london/hot-topics/blame-maggie-thatcher-and-every-government-since-for-knowingly-poisoning-us-with-carcinogenic-diesel-fumes/>

²¹ <https://www.gov.uk/government/groups/committee-on-the-medical-effects-of-air-pollutants-comeap>

that nanoparticles or ultrafine particles had quite different and much greater effects on lung inflammation, and so on, than the same stuff in a greater size but of the same weight. I put those together in my head and rang up a couple of friends, Ken Donaldson being one of them, who started as a technician with me and ultimately became Professor of Toxicology in Edinburgh. We wrote a paper overnight, really the next night, which went to The Lancet and got published, and it was influential, it was very influential [1995]. That's my memory of the episode and it's quite a vivid one." Page 77.

The Wellcome Trust published this remarkable record in 2016. See:

<https://wellcomecollection.org/works/tp6arpuu>.

Useful links

1. History

<https://www.britannica.com/event/Great-Smog-of-London>

30 October 1948: 'The Death Smog' in Donora, Pennsylvania, USA.

<https://www.nationalgeographic.com/history/article/decades-ago-donora-smog-disaster-exposed-perils-dirty-air>

2. Meteorology

Met Office

<https://www.metoffice.gov.uk/weather/learn-about/weather/case-studies/great-smog>

Case study by the Royal Meteorological Society

<https://www.metlink.org/resource/case-study-the-great-smog/>

3. The Times Archive

<https://www.thetimes.co.uk/archive>

4. Parliament

<https://www.theyworkforyou.com/>

5. Science

Wellcome Witness Seminar 2016: Air pollution research in Britain 1956-c2000

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1240556/>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1241789/>

6. Other