



# **Committee on the Medical Effects of Air Pollutants (COMEAP)**

## **2024 Annual Report**

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If you require any information about the references used in these reports, please email the Committee's Secretariat at [Comeap@ukhsa.gov.uk](mailto:Comeap@ukhsa.gov.uk)



## Preface



I am delighted to be writing the preface to COMEAP's Annual Report for 2024.

COMEAP considers a wide variety of topics each year to fulfil our remit of hazard identification and characterisation, risk assessment, quantification methods, horizon scanning and awareness raising. In 2024, our discussions included health risks from microplastics in air, indoor air pollution and the health effects of climate change.

One of the Committee's most important and public-facing pieces of work in 2024 was our input into the review of the UK Air Quality Information System (AQIS), a project led by the Department for Environment, Food and Rural Affairs (Defra) and the UK Health Security Agency (UKHSA). COMEAP's AQIS Sub-group met several times during the year to address specific topics within COMEAP's remit and provided timely input into the review. Our input helped shape the conclusions of the AQIS report, which was published in 2025. In particular, we provided 3 working papers relating to health advice accompanying the UK Daily Air Quality Index (DAQI), which will lead to improvements in the health advice provided to the public.

A key aspect of COMEAP's work is our advice on quantification of health effects of air pollution, which informs government policies. This is led by the Quantification of Air Pollution Risks in the UK (QUARK) subgroup, who in 2024 discussed and developed COMEAP opinions on the transferability of concentration-response relationships from outdoors to indoors, the shape of the concentration-response relationship with mortality at low concentrations of fine particles (PM<sub>2.5</sub>), and exposure measurement error and multi-pollutant models. Several Members of QUARK are also Members of an ad-hoc group on economic valuation of morbidity associated with air pollution. This group was established under the auspices of COMEAP, and also includes a number of external economic experts. The group is continuing to work on a substantive methodological report.

In 2024, we welcomed 8 new Members and 3 Associate Members (early- and mid-career researchers), who have substantially widened the multidisciplinary expertise on the Committee. Our 8 new Members were:

- Rosie O'Carroll, lay Member working in health communications
- Tom Parkes, lay Member working in air quality management in local government
- Dr Abigail Whitehouse, a respiratory physician who leads a children's environmental health clinic
- Professor Matthew Loxham, a professorial research fellow working in respiratory toxicology
- Professor Francesco Forastiere, a distinguished environmental epidemiologist
- Dr Suzanne Bartington, a Clean Air Champion and public health doctor with expertise in epidemiology and health impact assessment
- Dr Haneen Khreis, internationally recognised expertise in health impact assessment
- David Birchby, an experienced environmental health economist.

Associate Members are a new initiative for COMEAP, with the aim of encouraging mid- and early career researchers to develop skills in the application of evidence to inform policy. Their inputs also benefit the Committee by introducing new ideas, and approaches. Our 3 new Associate Members starting in 2024 were:

- Dr Dimitris Evangelopolous, an epidemiological statistician, already a co-opted Member of QUARK
- Dr Rob Ferguson, an environmental microbiologist with expertise in airborne allergens
- Dr James Milner with expertise in method development for health impact assessment

Ruth Chambers (COMEAP Lay Member), Professor Nicola Carslaw and Professor Alan Boobis (COMEAP Members) came to the end of their membership terms on the Committee in 2024, having provided very valuable inputs to its work over more than 10 years.

I would like to thank all existing and new Members for their commitment and contributions to the Committee's work in 2024. I also acknowledge the support and inputs from additional Members and advisors to COMEAP and COMEAP sub-groups, and the excellent quality support and inputs provided by the COMEAP secretariat.

Professor Anna Hansell

COMEAP Chair

July 2025

## Terms of reference

At the request of the Department of Health and Social Care (DHSC) to:

- advise the UK health departments on the effects on the health of both outdoor and indoor air pollutants on the basis of data currently available
- assess the need for further research
- liaise as necessary with other government bodies to assess the effects of exposure and associated risks to human health

## Code of practice

COMEAP aims to follow the Government Office for Science's Code of Practice for Scientific Advisory Committees.

## Note of thanks

Ruth Chambers (COMEAP Lay Member) and Professor Nicola Carslaw (COMEAP Member) left COMEAP in 2024 as their 10-year terms on the Committee had come to an end. Members were thanked for their valuable contributions and continuing support to the Committee.

Professor Alan Boobis's 10-year term as a COMEAP Member also came to an end during 2024, but we are grateful that he continued to contribute to the work of the Committee in an ex-officio role, as Chair of the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT)

New Members were appointed to COMEAP in April 2024, and Associate Members in June 2024. The full membership list is available in Annex A.

## Introduction

This report identifies the main activities of the Committee and the advice which the Committee has provided to government during 2024. The Committee met 4 times over this period. The meetings were a mixture of full day and half day meetings and were a combination of in-person, virtual and hybrid events.

Detailed work has also been undertaken in various Sub-groups of the Committee. During 2024, there were 2 virtual half day meetings of the Quantification of Air Pollution Risks in the UK (QUARK) Sub-group (a standing Sub-group), and a number of virtual meetings of an associated ad-hoc group on the economic valuation of morbidity associated with air pollution. There were 2 virtual meetings of the airborne nano – and microplastics Sub-group; 3 virtual meetings of the Air Quality Information Systems (AQIS) Sub-group; and several virtual meetings of the Childhood Asthma Sub-group.

The advice provided by the Committee in 2024 has been through working papers provided to inform the discussions of the Steering Group for the Air Quality Information System (AQIS) review (a project led by the Department for Environment, Food and Rural Affairs (Defra) and the UK Health Security Agency (UKHSA)) and written advice to the Welsh Clean Air Advisory Panel.

COMEAP's advice is used by Government Departments and local authorities as an input to their work of formulating advice to the public, undertaking cost-benefit analyses and developing policy. It has also received international recognition and acknowledgment.

## On-going work and issues currently under discussion

### Adverse Birth Outcomes Report

DHSC previously requested that COMEAP should examine the effects of air pollution on early life, due to growing interest from the public and government. As a result, the Sub-group on Adverse Birth Outcomes considered the evidence linking adverse birth outcomes with maternal exposure to air pollution during pregnancy.



The Secretariat is working on finalising the report, coordinating responses to specific questions, and checking diagrams and references. COMEAP Members received updates on progress during meetings held in 2024.

## Cardiovascular Morbidity Report

During 2024, the Secretariat liaised with colleagues at the London School of Hygiene and Tropical Medicine, on the report on quantifying cardiovascular morbidity, to address outstanding queries on aspects of the report. The Secretariat continues to work to prepare the report for publication. Members received updates on progress during COMEAP meetings held in 2024.

## Air Quality Information System (AQIS) review

A review of the UK Air Quality Information System (AQIS) has been undertaken. The need to make the public aware of the health effects of air pollution was highlighted by the Prevention of Future Deaths Report following the death of Ella Adoo Kissi-Debrah, who was the first person in the UK to have air pollution exposure named as a factor in the cause of death (Coroner of Inner South London, 2021<sup>1</sup>). This report raised the need to review the current provision of information on air quality and health. The project, which was overseen by the Department for Environment, Food and Rural Affairs (Defra) and the UK Health Security Agency (UKHSA), was steered by a multidisciplinary AQIS Steering Group. COMEAP provided advice to the steering group on specific aspects of the AQIS project, within COMEAP's remit.

The COMEAP AQIS Sub-group first met in January 2023. During 2024, the Sub-group produced 4 working papers which have been used to inform the discussions of the AQIS Steering Group. Three of these working papers relate to the behavioural advice that accompanies the UK Daily Air Quality Index (DAQI) which is used to provide information regarding short-term air pollution episodes. These working papers cover: the susceptibility of different groups to adverse health effects; the lag between short-term exposure and the occurrence of health outcomes; and the effects of exposure to air pollution during physical activity. The other working paper considers a possible approach to providing the public with an accessible statement about long-term average air pollution in their area and ways to reduce exposure both indoors and outdoors. COMEAP also produced a statement summarising key points and recommendations arising from the evidence reviewed in these working papers. COMEAP plans to publish the summary statement and the working papers.

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<sup>1</sup> Coroner for Inner South London (2021). [Regulation 28: Report to Prevention of Future Deaths](#)

This topic was discussed at the January and April 2024 COMEAP meetings. Minutes of the Committee's discussion are available at [Committee on the Medical Effects of Air Pollutants](#).

## Airborne Nano- and Microplastics

During 2024, COMEAP Members contributed to the development of a statement on the health risks of airborne nano- and microplastics (NMPs). At the COMEAP meeting held on 25 April 2024, it was agreed that the statement should summarise the current epidemiological and toxicological evidence, uncertainty and evidence gaps, and implications for risk assessment. Members had previously considered that tyre wear particles were significantly different to other plastic particles and were outside the scope of the statement.

The intention was that the statement drew upon, and complemented, existing reports by authoritative bodies, for example, the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) 'Sub-statement on the potential risk(s) from exposure to microplastics: Inhalation route', 2024<sup>2</sup> and a report published by the World Health Organization in 2022, on dietary and inhalation exposure to nano- and microplastic and human health<sup>3</sup>.

Following discussion at the COMEAP meeting on 20 June 2024, a group consisting of Members and external contributors was established to continue the drafting of the statement. An important point of discussion for the drafting group was the consideration of the key areas of future research needed to inform a risk assessment on the potential harm to health from inhalation of NMP.

Minutes of the Committee's discussions are available at [Committee on the Medical Effects of Air Pollutants](#).

## Indoor Air Quality

COMEAP is developing a response to the Air Quality Expert Group (AQEG) report on Indoor Air Quality in the UK published in 2022. In addition, QUARK has been looking at possible approaches that could be used to adapt coefficients, from studies of ambient pollutant concentrations, for application in burden estimates or health impact assessments of exposure indoors, and in other microenvironments. Two separate statements are being prepared: (a) a response to the AQEG report; (b) on the transferability of coefficients from outdoor air pollution epidemiology.

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<sup>2</sup> COT, 2024. [Sub-statement on the potential risk\(s\) from exposure to microplastics: Inhalation route](#)

<sup>3</sup> WHO, 2022. [Dietary and inhalation exposure to nano- and microplastic particles and potential implications for human health](#)

QUARK Members discussed the statement on approaches that could be used to modify coefficients from the outdoor air pollution epidemiology, so that they could be applied to quantify effects of exposure to pollutants in other microenvironments such as indoors, at the May and October 2024 QUARK meetings. At its meetings in June and November 2024, COMEAP discussed revised draft statements outlining QUARK's views on this topic, as well as revised statements in response to the AQEG report on indoor air quality.

Minutes of the Committee's discussion are available at [Committee on the Medical Effects of Air Pollutants](#).

## Shape of the concentration-response function

A summary of COMEAP's views on available studies in populations with low-level exposures to air pollution and the shape of the concentration-response function (CRF) that links mortality with long-term exposure to fine particulate air pollution (PM<sub>2.5</sub>)<sup>4</sup> was published in 2022, as Appendix B to COMEAP's statement on quantifying mortality associated with long-term exposure to PM<sub>2.5</sub> (COMEAP, 2022)<sup>5</sup>. This explained that COMEAP/QUARK did not consider that available evidence was sufficient to recommend any change from the assumption of a (log-) linear concentration-response function when quantifying the mortality effects associated with long-term exposure to PM<sub>2.5</sub>.

QUARK continues to monitor relevant new publications from the Health Effects Institute (HEI)-funded studies in Canada, US and Europe<sup>6</sup> and a harmonised analysis by Chen et al (2023)<sup>7</sup>. In 2024, QUARK discussed relevant methodological limitations, with the intention of developing an updated summary of COMEAP's views on the shape of the CRF associating mortality with long-term exposure to PM<sub>2.5</sub>, to reflect QUARK's discussions of the new analyses. COMEAP's position remained unchanged from the assumption of a (log-) linear CRF. QUARK Members discussed this topic at the May and October 2024 QUARK meetings. A revised statement is under preparation.

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<sup>4</sup> PM<sub>2.5</sub> is defined as the mass of particulate matter per unit volume of air passing a size-selective inlet with a 50% cut point efficiency at 2.5µm particle aerodynamic diameter. In practice, PM<sub>2.5</sub> contains fine particulate matter (PM) with a diameter of less than or equal to 2.5µm

<sup>5</sup> <https://www.gov.uk/government/publications/particulate-air-pollution-quantifying-effects-on-mortality>

<sup>6</sup> [14-3 Assessing Health Effects of Long-term Exposure to Low Levels of Ambient Air Pollution | Health Effects Institute](#)

<sup>7</sup> [Long-Term Exposure to Low-Level PM2.5 and Mortality: Investigation of Heterogeneity by Harmonizing Analyses in Large Cohort Studies in Canada, United States, and Europe | Environmental Health Perspectives | Vol. 131, No. 12](#)

This topic was discussed at the April 2024 COMEAP meeting. Minutes of the Committee's discussion are available at [Committee on the Medical Effects of Air Pollutants](#).

## Multi-pollutant model approaches and measurement error

QUARK has discussed methodological issues related to the impact of measurement error (exposure misclassification) on the associations found in epidemiological studies. This can impact the size of the associations reported and may result in effect transfer between pollutants in the case of multi-pollutant models. In 2024, QUARK continued to develop a position paper on measurement error in epidemiological studies, and its possible implications for quantification of health effects attributable to air pollution, as well as the interpretation and use of results from multi-pollutant models. The intention is to develop a statement of the Committee's views on this topic for publication.

## Ad-hoc group on economic valuation of morbidity related to air pollution

An ad-hoc group on economic valuation of morbidity related to air pollution was formed in 2022, in response to a need identified by QUARK: to ensure that valuations align fully with impacts quantified using response functions recommended by COMEAP. The scope for the group is to discuss and propose ways for improving the methods used to value morbidity associated with air pollution. This work will inform cost-benefit assessments of policies related to air pollution.

A first draft of a report collating chapters on different types of costs has been compiled; the progress of the report has been monitored through meetings organised by the Secretariat with the key authors of the report.

This topic was discussed at the January and November 2024 COMEAP meetings. Minutes of the Committee's discussion are available at [Committee on the Medical Effects of Air Pollutants](#).

## Childhood asthma and air pollution

In 2023, the COMEAP Strategy Group confirmed childhood asthma as the next topic for consideration by the Committee. The project seeks to update COMEAP's views

on the scientific evidence linking air pollution and asthma, taking into account research undertaken since the publication of its previous advice in 2010 and 1995.

To take into consideration the views and suggestions from stakeholders, 2 stakeholder engagement activities were conducted in March and April of 2024 to collect insights to inform the scope of the work. The insights collected were reported and discussed in the June 2024 COMEAP meeting.

An Asthma Sub-group was formed, and the first meeting held in November 2024. In the meeting, the Sub-group reflected on the stakeholders' views and discussed the scope of the review. The proposed scope was then reported and discussed in the November 2024 COMEAP meeting. It was suggested that the Sub-group should seek further advice from clinical experts before finalising the scope. A Sub-group meeting inviting external clinical experts was scheduled for January 2025.

This topic was discussed at the June and November 2024 COMEAP meetings. Minutes of the Committee's discussion are available at [Committee on the Medical Effects of Air Pollutants](#).

## Quantification updates

The World Health Organization (WHO) is co-ordinating 2 projects intended to update and expand its recommendations for quantifying health effects associated with air pollutants. One will make recommendations for morbidity outcomes (Estimating the Morbidity from Air Pollution and its Economic Costs; EMAPEC<sup>8</sup>) and the other focusing on mortality (Update of the Health Risks of Air Pollution in Europe, HRAPIE-2)<sup>9</sup>. COMEAP is assessing whether reviews undertaken to inform these projects might be a useful resource to inform COMEAP's future recommendations for quantification. The meeting held in November 2024 included an initial discussion of these reviews. Current and former Members of COMEAP and the Secretariat are involved in these projects.

This topic was discussed at the November 2024 COMEAP meetings. Minutes of the Committee's discussion are available at [Committee on the Medical Effects of Air Pollutants](#).

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<sup>8</sup> [Estimating the morbidity from air pollution and its economic costs](#)

<sup>9</sup> See paragraph 24 of [ECE EB.AIR GE.1 2022 17-2213114E.pdf \(unece.org\)](#)

## Other topics covered in 2024

### Health Effects of Climate Change report / NetZero and air pollution

At the May 2022 COMEAP meeting, COMEAP Members were invited to comment on chapters on air quality proposed for inclusion in the update to the UKHSA's Health Effects of Climate Change (HECC) report. Members were requested to provide comments on the proposed outlines for the report chapters, provide specific comment on the approaches for quantification, provide feedback on the approaches for reviews and inform the Committee of any appropriate resources that might be helpful for the development of the report.

The updated HECC report was published in September 2023<sup>10</sup>. The findings reported in the air pollution chapters were presented to COMEAP at the January 2024 meeting, as part of a short workshop on the impacts of climate change and/or net zero policies on air pollution and consequent effects on public health. This workshop was organised to follow up from the recommendation made at the 2023 COMEAP Strategy Group meeting: that COMEAP should be kept informed regarding the chapters of the UKHSA's Health Effects of Climate Change (HECC) report relevant to air pollution; and the suggestion to hold workshops on some emerging topics, including climate change/net zero policies, air pollution and health.

During the workshop, recent research on net zero, air quality and health was also presented by invited speakers. COMEAP discussed the implications of the science presented, and whether COMEAP could make a valuable contribution on any of these topics.

Minutes of the Committee's discussion are available at [Committee on the Medical Effects of Air Pollutants - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/committees/committee-on-the-medical-effects-of-air-pollutants)

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<sup>10</sup> [Health Effects of Climate Change in the UK: state of the evidence 2023 \(publishing.service.gov.uk\)](https://publishing.service.gov.uk/government/publications/health-effects-of-climate-change-in-the-uk-state-of-the-evidence-2023)

## Environment (Air Quality and Soundscapes) (Wales) Act 2024

During the COMEAP meeting held in January 2024, the Welsh Government (WG) assessor for COMEAP, explained the Environment (Air Quality and Soundscapes) (Wales) Act<sup>11</sup>, and gave a brief summary of powers and duties under the Act. A Clean Air Advisory Panel (CAAP) had been established to provide expert advice to Welsh Ministers regarding air quality, and was coordinating and developing advice on air quality target proposals. The COMEAP Secretariat had already provided a summary of relevant COMEAP advice for CAAP's information.

At the COMEAP meeting held in November 2024, the WG assessor provided an update on the CAAP's<sup>12</sup> work, and requested that COMEAP Members comment on a draft CAAP paper related to establishing targets for PM<sub>2.5</sub>. A number of COMEAP Members with a range of different expertise provided comments, which were collated by the Secretariat and reviewed by the COMEAP Chair, before being provided to Welsh Government and the Chair of the CAAP in December 2024.

Minutes of the Committee's discussion are available at [Committee on the Medical Effects of Air Pollutants](#).

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<sup>11</sup> [Environment \(Air Quality and Soundscapes\) \(Wales\) Act 2024 \(legislation.gov.uk\)](#)

<sup>12</sup> New appointments to the CAAP in September 2024 included 2 COMEAP Members [Clean Air Advisory Panel: Announcement of new members | GOV.WALES](#)



## Annex A. COMEAP membership

### Committee on the Medical Effects of Air Pollutants

#### Chair

Professor Anna Hansell (Professor of Environmental Epidemiology, University of Leicester)

#### Members

Dr Suzanne Bartington (Clinical Associate Professor in Environmental Health, University of Birmingham) (from April 2024)

Professor Alan R Boobis (Emeritus Professor of Toxicology, Imperial College London) (until April 2024)

David Birchby (Associate Director – Environmental Economics, Logika Group) (from April 2024)

Professor Martin Clift (Biomedical Sciences, Swansea University)

Professor Nicola Carslaw (Professor in Indoor Air Chemistry, University of York) (until April 2024)

Ruth Chambers (Lay Member) (until April 2024)

Professor Francesco Forastiere (School of Public Health, Imperial College London) (from April 2024)

Professor Roy Harrison (Queen Elizabeth II Birmingham Centenary Professor of Environmental Health, University of Birmingham)

Professor Mathew Heal (Chair of Atmospheric Chemistry, University of Edinburgh)

Dr Mike Holland (Freelance consultant in economic assessment of environmental policies) (Member until April 2024; co-opted Member from April 2024)

Professor Klea Katsouyanni (Professor of Public Health, Imperial College London)

Dr Haneen Khreis (Senior Research Associate, MRC Epidemiology Unit, University of Cambridge) (from April 2024)

Professor Duncan Lee (Professor of Statistics, University of Glasgow)

Professor Matthew Loxham (Principal Research Fellow, University of Southampton) (from April 2024)

Dr Mark Miller (Senior Research Fellow, University of Edinburgh)

Dr Ian Mudway (Senior Lecturer, School of Public Health, Imperial College London)

Rosie O'Carroll (British Thoracic Society) (Lay Member) (from April 2024)

Tom Parkes (London Borough of Camden) (Lay Member) (from April 2024)

Professor Gavin Shaddick (Pro Vice-Chancellor, and Head of College of Physical Sciences and Engineering, Cardiff University)



John Stedman (Air Quality Analysis and Policy Support Knowledge Leader, Ricardo Energy and Environment) (co-opted Member)

Dr Abigail Whitehouse (Senior Clinical Lecturer, Queen Mary University of London) (from April 2024)

## Associate Members

Dr Dimitris Evangelopoulos (Research Fellow, Imperial College London) (from June 2024)

Dr Rob Ferguson (Senior Lecturer, University of Essex) (from June 2024)

Dr James Milner (Associate Professor, London School of Hygiene and Tropical Medicine) (from June 2024)

## Secretariat (UK Health Security Agency)

Alison Gowers (Scientific Secretary)

Vanessa Bixley (Administrative) (until June 2024)

Christopher Heath (Administrative) (from August 2024)

Dr Artemis Doutsis (Scientific)

Eve Draper (Scientific)

Dr Naomi Earl (Scientific)

Dr Karen Exley (Scientific)

Dr Christina Mitsakou (Scientific)

## Annex B. Register of Members' interests

The register of Members' interests (2024) can be found below. This is also available via [the COMEAP website](#).

Member	Personal interests		Non-personal interests	
	Name of company	Nature of interest	Name of company	Nature of interest
<b>Professor A. Hansell (Chair)</b>	University of Leicester	Salary	UKRI (UK Research and Innovation)	Research grants
	Greenpeace	Annual membership and occasional small donation for over 35 years	European Commission	Research grants
		.	National Institute of Health Research	Research grants
			British Heart Foundation	Research grants
			European Space Agency	Research grants
			UKHSA and Defra	Research tenders
			Imperial College London, UKHSA	Honorary position
<b>Professor R. Harrison</b>	Nextgen Nano Ltd	Shareholder	Natural Environment Research Council	Research grants
	Renovare Fuels Ltd	Shareholder	European Union	Research contract
	Teysha Technologies Ltd	Shareholder		
	Innovation Agri-tech Group	Shareholder		
	ESE Capital	Shareholder		
	Engen Systems	Bondholder		
	Leigh Day	Author of expert report		
	King Abdulaziz University, Jeddah, Saudi Arabia	Adjunct Distinguished Professor		
	Quarry Battery Company	Bondholder		
	REWS	Bondholder		
	University of Birmingham	Salary		
	No paid work or sponsorship from industry			
<b>Dr M. Holland</b>	UK government (Defra, DoH) and related bodies (for example, Environment Agency, Climate Change Committee)	Consultancy	European Association of Environmental and Resource Economists	Member
	UK national governments (Scotland, Wales)	Consultancy	Imperial College, London	Honorary Research Fellow
	London Borough of Hillingdon	Consultancy		

Member	Personal interests		Non-personal interests	
	Name of company	Nature of interest	Name of company	Nature of interest
	European Commission (DG Research, DG Environment, DG Transport and Energy, European Environment Agency, JRC Sevilla)	Consultancy		
	Other international organisations (OECD, IAEA, ADB, IEA, WHO, WorldBank)	Consultancy		
	Various consultancies (eftec, CEH, Wood, Ricardo-AEA, IIASA, wca-environment, Eunomia, exponent)	Consultancy		
<b>Dr M.R. Miller</b>	University of Edinburgh	Salary	British Heart Foundation (BHF)	Research grant
	Lloyds	Shareholder	UKRI, Natural Environmental Research Council (NERC)/Medical Research Council (MRC)	Research grants
	Halifax	Shareholder	NIHR	Research grant
	World Wildlife Fund	Monthly donation	Royal Society	Research grant
			World Heart Federation	Member/Chair of Air Pollution and Climate Change Expert Group
			SPF Clean Air Programme	Member Knowledge Exchange Group
			Environmental Protection Scotland	Member, Air Quality Expert Group
			Westminster Commission for Road Air Quality	Member
<b>Professor G. Shaddick</b>	Cardiff University	Salary	EPSRC; European Commission; World Health Organisation; NIHR; Pfizer Ltd; Met Office; Innovate UK, BEIS; NERC	Research grants or contracts
	Royal Mail	Shareholder	University of Exeter	Honorary positions
	Shaddick-English Consulting Services	Director		
	Novo Nordisk Foundation	Member of Committee for Data Science		
<b>Mr J. Stedman</b>	Ricardo	Salary	Ricardo (research contract Modelling of Ambient Air Quality)	Principal Air Quality Consultant
<b>Professor D. Lee</b>	University of Glasgow	Salary	ESRC; MRC; EPSRC; Innovate UK; NERC; Scottish Government; TB Alliance; EA	Research grants
	External examiner of MSc programmes in Statistics at Lancaster University and Trinity College Dublin	Salary		

Member	Personal interests		Non-personal interests	
	Name of company	Nature of interest	Name of company	Nature of interest
<b>Professor M. Heal</b>	Cycling advocacy charities Sustrans and Spokes	Regular and occasional small donations	Natural Environment Research Council Defra and UK CEH Defra	Studentship funding Studentship funding Member of the Air Quality Expert Group
<b>Professor K. Katsouyanni</b>	Imperial College London	Salary	European Commission	Research grants
	National and Kapodistrian University of Athens	Emeritus Professor	U.S. Health Effects Institute	Research grant
	ECOCITY (NGO based in Greece)	Member of the Scientific Committee		
	European Respiratory Society (ERS)	Member of the Committee for Environment and Health		
	WHO	Member of the Global Air Pollution and Health-Technical Advisory Group		
<b>Dr I. Mudway</b>	Imperial College London	Salary	NERC	Research grants
	No shareholdings		MRC	Research grant
	No personal consultancies		The Barts Charity	Research grant
	Off the Curriculum	Trustee	USA Health Effect Institute	Research grant
			MRC Centre for Environmental and Health	Research grant
			NIHR Health Protection Research Unit in Environmental Exposures and Health	Member
			NIHR Health Protection Research Unit in Chemical and Radiation Threats and Hazards	Member
			Gresham College	Visiting Professor
<b>Professor M.J.D. Clift</b>	Swansea University	Academic (Professor) Employer (1 December 2015 to the present)		
	University of Manchester	External Examiner (September 2021 to the present) Examiner for MSc Nanomedicine Course		
	Applied Graphene Materials Ltd.	Invited International Expert for Scientific Consultancy (October 2019). Provision of expert insight at a one-day workshop on the inhalation health hazard of different graphene nanomaterials.		

Member	Personal interests		Non-personal interests	
	Name of company	Nature of interest	Name of company	Nature of interest
	Nooku	Invited consultancy project assessing literature on indoor air quality related to human disease states (February 2023 to the present). Provision of expert scientific input and literature review of indoor air quality related to human health effects.		
	UK Health and Security Agency	Honorary Contract (December 2022 to December 2026). Provision of financially supported scientific activities (following review of EOI processes within UK HSA).		
	Titanium Dioxide Industrial Committee (TDIC)	Invited International Expert for Scientific Consultancy (November 2023 to the present). Provision of expert knowledge of inhalation particle toxicology.		
	UK Animal Alternative Technologies Society	Chairperson of Society (Registered Charity) (December 2022 to the present)		
	British Toxicology Society; Scientific Sub-Committee Member	Member (November 2017 to the present)		
	Animal Free Research Scientific Committee Member	Member (February 2019 to January 2024)		
	Editor-in-Chief of Fibres	Member (June 2018 to the present)		
	Associate (that is, Senior) Editor of Journal of Nanobiotechnology	Member (June 2016 to January 2024)		
	Associate (that is, Senior) Editor of Frontiers in BioEngineering and BioTechnology	Member (August 2020 to January 2024)		
	Associated (that is, Senior) Editor of Particle and Fibre Toxicology	Member (June 2022 to the present)		
	Editorial Board member of Mutagenesis	Member (January 2017 to the present)		
	Editorial Board member of Food and Chemical Toxicology	Member (June 2021 to January 2024)		
<b>Professor F. Forastiere</b>	Health Effects Institute, USA	Consultant for Systematic Review of traffic-related air pollution (past)	EU-funded VALESOR project (current)	Health and economic impact of air pollution
	World Health Organization	Occasional consultant on air pollution-related issues		

Member	Personal interests		Non-personal interests	
	Name of company	Nature of interest	Name of company	Nature of interest
	TPHG Technologies Limited, Lagos, Nigeria. Funded by C40 Cities	Consultant on 'Integrated GHG and air quality emissions inventory, health impact analysis, and air quality monitoring support in Lagos' (past)		
Dr A. Whitehouse	Queen Mary University of London	Salary	Parexel	PI and CI for commercial research studies on wheezing and asthma treatments
			Barts Charity	Grant for Environmental Health Clinic
Mrs R. O'Carroll	British Thoracic Society	Salary		
Dr S. Bartington	University of Birmingham	Salary	Oxfordshire County Council	Academic consultancy
	UK Health Security	Honorary Consultant Academic Contract	Ricardo plc	Consultancy within Defra Research Development and Education Framework
	Bartington Instruments Ltd	Shareholder	UKRI (UK Research and Innovation)	Research grants
	Cycling UK	Membership	Wellcome Trust	Research grant
			National Science Foundation	Research grant
			National Institute of Health and Care Research	Research grants
Mr D. Birchby			SPF Clean Air Programme (UKRI)	Clean Air Champion
	Logika Group	Salary, based on consultancy work for various clients as detailed below		
	UK government (for example, Defra) and related bodies (for example, Forestry Commission, Environment Agency)	Consultancy		
	UK national governments (Scotland, Wales)	Consultancy		
	UK Local Authorities (for example, Cambridge City Council)	Consultancy		
	European Commission (for example, DG Environment)	Consultancy		
	Other international organisations (for example, ADB, EBRD, GSC)	Consultancy		
	Private sector organisations (for example, GP Planning)	Consultancy		

Member	Personal interests		Non-personal interests	
	Name of company	Nature of interest	Name of company	Nature of interest
	World Wildlife Fund	Monthly donation		
	Médecins Sans Frontières	Monthly donation		
	Wateraid	Monthly donation		
<b>Dr H. Khreis</b>	Texas A&M Transportation Institute and University of Cambridge	Salary		
<b>Dr M. Loxham</b>	University of Southampton	Salary	Biotechnology and Biological Sciences Research Council UK (BBSRC)	Previous and current Fellowships
	AXA Framlington Biotech fund	Holding	AXA Research Fund	Personal Fellowship to group member
	European Respiratory Society	Member	Academy of Medical Sciences	Research Grant
	British Society for Lung Research	Member	EPSRC	Research Funding
	NIHR Southampton Biomedical Research Centre	Member	NIHR Southampton Biomedical Research Centre	Research Funding
	No individual shareholdings		Asthma, Allergy, and Inflammation Research (AAIR) Charity	Research Funding
	No personal consultancies		Southampton Marine and Maritime Institute	Research Funding
			Medical Research Council, Engineering and Physical Sciences Research Council, Leverhulme Trust, Gerald Kerkut Charitable Trust	Studentships
<b>Mr T. Parkes</b>	London Borough of Camden	Salaried employment (full-time)	London Borough of Camden	Grant funding awards from Defra AQ Grant Scheme
<b>Dr R. Ferguson</b>			Academy of medical Sciences	Research grant (PI)
			European Commission	Research grant (Co-I)
			Natural Environment Research Council	Research grant (Co-I)
			Northeast Essex Clinical Commissioning Group	Research grant (Co-I)
<b>Dr J. Milner</b>	London School of Hygiene and Tropical Medicine	Salary	Wellcome Trust, NERC, EPSRC, NIHR, UKERC, Fondation Botnar, Bernard van Leer Foundation, European Climate Foundation	Research grants
	C40 Climate Leadership Group	Consultancy	NICE, UK Department of Energy and Climate Change (DECC), Irish Department of Communications,	Research grants

Member	Personal interests		Non-personal interests	
	Name of company	Nature of interest	Name of company	Nature of interest
			Climate Action and Environment (DCCAE)	
	Buro Happold	Consultancy		
	UK Atmospheric Dispersion Modelling Liaison Committee	Consultancy		
Dr D. Evangelopoulos	Imperial College London	Salary	UKRI	Research Grant
			MRC Centre for Environment and Health	Research Grant
			NIHR Health Protection Research Unit in Environmental Exposures and Health	Member
			Health Research from Home Advisory Committee	Member
			Environmental Health Perspectives – Early Career Researcher Initiative Advisory Panel	Member
Professor A Boobis OBE	Barclays Bank	Shareholder	European Commission (Horizon 2020) (until 05/2019)	Research grant/contract
	Bank Santander	Shareholder		
	BT Group	Shareholder		
	Centrica	Shareholder		
	Iberdrola SA	Shareholder		
	National Grid	Shareholder		
	Lloyds	Shareholder		
	Owlstone Medical (no remuneration)	Member of the Scientific Advisory Board		
	ILSI (International Life Sciences Institute) (no remuneration)	Member and Board of Trustees until 2023)		
	ILSI Europe (no remuneration)	Member of Board of Directors		
	Health and Environmental Sciences Institute (no remuneration)	Member of Board of Trustees (until 2021)		
	Various ILSI Europe working groups on generic risk assessment issues	Member/co-chair		
	Swiss Centre for Applied Human Toxicology (no remuneration) (until Dec 2020)	Member of Science Advisory Board (until 2020)		



Member	Personal interests		Non-personal interests	
	Name of company	Nature of interest	Name of company	Nature of interest
	Michigan State University MSU Center for Research on Ingredient Safety (CRIS)	Member of External Advisory Committee		
	Agency for Innovations in Food and Chemical Safety Programme, Science, Technology and Research, Singapore (A*STAR)	Member of Scientific Advisory Board (until 2022)		
	ISO/TC126/Working Group 10: “Intense Smoking Regime” (nominated by UK Department of Health)	Chair/convenor (until 2022)		
	WHO Study Group on Tobacco Product Regulation (TobReg)	Member		
	Joint FAO/WHO Expert Committee on Food Additives (Residues of Veterinary Drugs) (JECFA)	Member/Chair		
	Joint FAO/WHO Meeting on Pesticide Residues (JMPR)	Member		
	Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT)	Chair		
	WHO Core Expert Group on human health risks from exposure to nano- and microplastics	Member (until 2023)		
	Advisory Board of Plastics Europe Brigid (microplastics) project (non-remunerated)	Member		
	Advisory Group to Personal Care Products Council (PCPC) Sunscreen Consortium – cancer risk assessment (non-remunerated)	Member		
Professor N Carslaw	No shareholdings		Alfred P. Sloan Foundation	2x Research grants
	No personal consultancy		NERC	PI, Co-I on research grants
			Wolfson Foundation	PI on capital grant
Ms R Chambers	Greener UK	Senior fellow working on implementation of Environment Act		
	Feedback Global	Chair		

Member	Personal interests		Non-personal interests	
	Name of company	Nature of interest	Name of company	Nature of interest
	Hexagon Housing Association	Non-executive director		

## Annex C. QUARK Sub-group membership

### Committee on the Medical Effects of Air Pollutants Sub-group on Quantification of Air Pollution Risks in the UK (QUARK)

#### Chair

Dr Mike Holland

#### Members

Dr Suzanne Bartington

David Birchby

Dr Dimitris Evangelopoulos

Professor Francesco Forastiere

Professor Klea Katsouyanni

Dr Haneen Khreis

Professor Duncan Lee

Dr James Milner

Professor Gavin Shaddick

#### Co-opted Members

John Stedman

#### Secretariat

Dr Christina Mitsakou (QUARK Secretariat lead)

Dr Artemis Doutsis

Dr Naomi Earl

Alison Gowers

## Annex D. Adverse Birth Outcomes Sub-group membership

### Committee on the Medical Effects of Air Pollutants Sub-group on Adverse Birth Outcomes

#### Chair

Professor Jonathan Grigg (Queen Mary University of London)

#### Members

Professor Debbie Jarvis (Imperial College London)

Dr Heather Walton

#### Co-opted Members

Professor Peter Brocklehurst (University of Birmingham)

Dr Julia Fussell (Imperial College London)

Professor Eric Jauniaux (University College London)

Dr Rachel Smith (Imperial College London)

Professor Mireille Toledano (Imperial College London)

#### Secretariat

Dr Philippa (Pippa) Douglas (Secretariat lead until August 2020)

Eleanor Sykes (Secretariat lead until March 2022)

Eve Draper

Dr Naomi Earl

Dr Karen Exley

Alison Gowers

## Annex E. Air Quality Information System (AQIS) Sub-group membership

### Committee on the Medical Effects of Air Pollutants sub-group on Air Quality Information System

#### Chair

Professor Martin Clift

#### Members

Dr Mike Holland

Professor Klea Katsouyanni

Dr Mark Miller

Dr Ian Mudway

#### Co-opted Members

Dr Paul Pfeffer (Queen Mary University of London)

#### Secretariat

Eve Draper (Secretariat lead)

Dr Naomi Earl

Alison Gowers

#### Acknowledgements

The AQIS Sub-group would also like to acknowledge valuable input from COMEAP Member Professor Gavin Shaddick

COMEAP and the AQIS Sub-group would like to thank the following individuals for their valuable input to the work on the topic of physical activity and air pollution:

Dr Gavin Devereux (University of Suffolk)

Scarlett Moloney (Anglia Ruskin University)

Dr Eda Tonga (University of Leicester)

## **Annex F. Childhood Asthma and Air Pollution Sub-group membership**

### **Committee on the Medical Effects of Air Pollutants sub-group on Childhood asthma and air pollution**

#### **Chair**

Professor Anna Hansell

#### **Members**

Professor Martin Clift

Dr Dimitris Evangelopoulos

Dr Robert Ferguson

Professor Francesco Forastiere

Dr Haneen Khreis

Professor Matthew Loxham

Dr Abigail Whitehouse

#### **Secretariat**

Dr Holly Lam (UKHSA, Secretariat lead)

Alison Gowers

Dr James Isaac

Emily Wallbanks

## **Annex G. Airborne nano- and micro-plastics drafting group membership**

### **Committee on the Medical Effects of Air Pollutants drafting group on microplastic air pollution**

#### **Members**

Professor Alan R Boobis (Emeritus Professor of Toxicology, Imperial College London)  
Professor Martin Clift (Professor, Biomedical Sciences, Swansea University)  
Professor Anna Hansell (Professor of Environmental Epidemiology, University of Leicester)  
Professor Matthew Loxham (Principal Research Fellow, University of Southampton)  
Dr Ian Mudway (Senior Lecturer, School of Public Health, Imperial College London)

#### **Co-opted Members**

Dr Todd Gouin (TG Environmental Research)  
Dr Ben Williams (Air Quality Management Resource Centre, University of the West of England)  
Dr Stephanie Wright (Imperial College London)

#### **Secretariat**

Dr James Isaac (UKHSA) (Secretariat lead)  
Alison Gowers

## Annex H. Ad-hoc group on economic valuation of morbidity related to air pollution

This ad-hoc group was formed in 2022. Below are the details of Members who have attended meetings and supported the ad-hoc group during 2024.

### Chair

Dr Mike Holland

### Government departments or agencies

Srobana Ghosh (Health Economist, UK Health Security Agency)

Lois Hanna (Health Economist, UK Health Security Agency)

Laurence Mounce (Economist, Department for Environment, Food and Rural Affairs – Defra)

Dr Lesley Owen (Health economics, National Institute for Health and Care Excellence – NICE)

Laurent Pipitone (Head of Economic Analysis, Air Quality and Industrial Emissions, Defra)

Sophie Richard (Economist, Defra)

### Academia: economics and other science

Prof John Cairns (Professor of Health Economics, London School of Hygiene and Tropical Medicine)

Dr Yan Feng (Reader in Health Economics, Queen Mary's University)

Dr Alistair Hunt (Lecturer in the Department of Economics, University of Bath)

Dr Laure de Preux (Assistant Professor of Economics, Imperial College London)

Dr Tim Taylor (Associate Professor in Environmental and Public Health Economics, University of Exeter)

Dr Diana Varaden (Lecturer in Environmental Social Science and Health, Imperial College London)

### Clinicians and relevant academia

Dr Jonathan Behar (Consultant cardiologist and electrophysiologist, Guy's and St Thomas' NHS Foundation Trust)

Professor Chris Griffiths (Professor of Primary Care, Queen Mary University of London)

Emeritus Professor Paul Jones (Professor of Respiratory Medicine, St George's University)

Professor Charles Knight (Professor of Cardiology, William Harvey Research Institute)

Professor Jenny Quint (Professor of Respiratory Epidemiology, Imperial College London)

### Consultancies – Independents

David Birchby (Economist, Logika Group)

John Henderson (Health economist, independent, previously at DHSC)



## COMEAP/QUARK Scientific Secretariat

Dr Christina Mitsakou (Secretariat lead)

Alison Gowers

Samuel Thompson