UK Health Alliance on Climate Change

Department of Environment, Food and Rural Affairs
Consultation on Environmental Targets

The UK Health Alliance on Climate Change is an alliance of UK health organisations including royal medical and nursing colleges, British Medical Association, Academy of Medical Science, Royal Society of Medicine, British Medical Journal, The Lancet, and many other health-focused organisations and faculties. Collectively, the total membership of our members is about 960,000 health professionals.

We write in response to the Consultation on environmental targets published by the Department for Environment, Food and Rural Affairs on 6 May 2022. Our response specifically focused on the target proposals for air quality outlined on page 32 of the consultation.

Our rationale for disagreement with the targets proposed, combined with evidence of the harms of air pollution on health provided from across the membership of UKHACC, is presented below.

45. Do you agree or disagree with the level of ambition proposed for a PM2.5 concentration target?

Disagree.

46. What reasons can you provide for why the government should consider a different level of ambition?

In October 2021, we called for a legally-binding commitment to reducing fine particulate air pollution ($PM_{2.5}$) in the UK to below the maximum level recommended by the World Health Organisation (WHO) in 2005 (10 µg/m^3), and to doing so by 2030 at the latest. Our position has not changed, in fact it has strengthened as more people suffer ill health and death as a consequence of breathing dirty air and the burden this places on our exhausted health service. In the last number of months, there are have been multiple demands for greater urgency in action, particularly from the Intergovernmental Panel on Climate Change which has called for rapid, deep emissions cuts across all sectors in order to halve emissions by 2030 stating that any further delay in concerted global action on adaptation and mitigation will miss a brief and rapidly closing window of opportunity to secure a liveable and sustainable future. [1]

Air pollution is among the greatest environmental determinants of health[2] and contributes to many serious and chronic health conditions affecting every organ of the body.[3] Public Health England figures for a period of five years before the pandemic showed 5% of all deaths were attributable to $PM_{2.5}$ pollution specifically, while thousands more are living with health conditions caused or exacerbated by dirty air, increasing vulnerability to viruses like Covid19.[4] Repeated exposure over months and years can worsen the impacts of dementia, diabetes, hypertension, lung cancer and pneumonia.[5]

There is no safe level of $PM_{2.5}$ pollution. The proposed target of achieving 10 μg/m^3 by 2040 would mean the UK limit would be double the WHO's recommended guideline of 5 μg/m^3 18 years from now. [6] This target lacks ambition and would place the UK behind many other nations in achieving cleaner air for its people. Like the coroner who recorded air pollution as a cause of death in the tragic case of nine-year-old Ella Kissi-Debrah[7], we believe that achieving a target of 10 μg/m^3 by 2030 should be seen as the absolute minimum[8] with a longer term aim of placing us on a trajectory of achieving the WHO's recommended guideline of 5 μg/m^3, which is based on several systematic reviews specifically designed to identify the lowest concentration of pollution that produces a measurable increase in short- and long-term health risks.[6]

The sources of particulate pollution - road transport, domestic and industrial burning – are also the sources of a significant proportion of the UK's greenhouse gas emissions. We must tackle the challenges of climate change and air pollution simultaneously if we are to meet the UK's commitment to reaching net zero carbon emissions and to show leadership in doing so.

The modelling presented in the Evidence Packs used to inform the government's feasibility in attaining specific PM2.5 reductions indicates that 11ug/m is 'likely to be achievable' in all scenarios apart from baseline and medium (in which it is possibly achievable) by 2030. The modelling then jumps a decade to 2040. It is unjustifiable that modelling has not been conducted to determine when in the interim period between 2030 and 2040 10ug/m3 would be achievable in the different scenarios modelled.

The modelling presented in the evidence packs is inconsistent with evidence from a study by researchers from the Environmental Research Group at Imperial College London and consultancy Vivid Economics, which was commissioned by the Clean Air Fund. This research found that if all existing and in-the-pipeline policies, directives and regulations set out in the 2019 Clean Air Strategy are properly implemented, 99.8% of the country could achieve a target of 10 μg/m^3 by 2030.[8] Their research found that while 41% of local authorities had $PM_{2.5}$ exposure levels above this level in 2018, this would fall to less than 1% by 2030 if policies are successfully implemented. And the associated health and economic benefits were significant.

The descriptions of the measures included in the future 'medium', 'high', and 'speculative' target scenarios presented in the evidence packs lack clarity to enable full scrutiny of them. For example, the evidence lacks specific examples of the types of policies, technologies and behaviour changes assumed as part of the modelling exercise. Also, a full cost-benefit analysis has only been presented for two options: do nothing and a target of PM2.5 of 10ug/m3 and exposure reduction of 35% by 2040. This makes it impossible to compare the net benefits of the proposed targets with more ambitious targets.

The modelling presented in the evidence packs is based on absolute terms, with scenarios being simply referred to as 'unlikely', 'possible' and 'likely' to be achieved. Also, the models created are 'closed source' which makes it impossible to scrutinise the modelling assumptions and confidence intervals used. The lack of transparency and information on uncertainty bands makes it impossible to fully assess the degree of uncertainty associated with the results presented.

Evidence from previous research indicates that the positive health benefits of achieving a target of 10ug/m3 by 2030 include 20 fewer infant deaths, 388,000 fewer asthma symptom days in children, and 6,300 fewer respiratory and cardiovascular hospital admissions annually. In total, about 98,000 life years could be gained annually with people living longer, suffering less ill health, a reduced burden on the health service and fewer days lost to absenteeism in the workplace if we achieved 10 μg/m^3 by 2030.[8, 9] CBI Economics has reported that improving air quality could bring an annual boost of £1.6

billion to the UK economy through 3 million additional working days and reduced rates of early retirement.[10]

Our view is that a more ambitious, but achievable, target of 10 µg/m^3 by 2030 would be more appropriate and would put England on a trajectory to improve health and build resilience against future health crises and pandemics as well as boosting the economy and increasing productivity.

47. Do you agree or disagree with the level of ambition proposed for a population exposure reduction target?

Disagree.

48. What reasons can you provide for why the government should consider a different level of ambition?

The exposure reduction target is closely linked to the absolute PM2.5 reduction target, with similar concerns regarding lack of ambition and the impact on health by prolonging population exposure to high levels of PM2.5 until 2040.

The proposed exposure reduction target of 35% by 2040 compared to 2018 is equivalent to a target population exposure of 6.5ug/m3 by 2040 (2018 baseline population exposure of 10ug/m3). This figure is significantly higher that the WHO recommended target of 5ug/m3 and puts the health of too many people at risk over a prolonged period.

The data provided in the evidence packs do not provide sufficient information regarding the methodology used for the population exposure reduction targets to allow further scrutiny of the calculations used.

We also have concerns regarding the lack of detail regarding the monitoring network and the proposed expansion of the network in the evidence packs. The document indicates these details will be set out in the draft presented to parliament, suggesting they will not be subject to consultation. These include:

- The minimum number of monitoring sites
- The minimum number of representative measurements to asses compliance
- The requirements for the spread of monitoring sites over different areas
- The cap of the number of monitors needed for the largest population areas
- The extent to which monitoring requirements from the previous EU regime are being retained

Based on the concerns outlined above we do not support the proposed population exposure reduction target of 35% by 2040 based on a 2018 baseline.

References:

1. Intergovernmental Panel on Climate Change sixth assessment report: https://www.ipcc.ch/
2. https://www.who.int/vietnam/news/feature-stories/detail/ten-threats-to-global-health-in-2019
3. Schraufnagel et al., 2019. Air Pollution and Noncommunicable Diseases, CHEST 2019; 155(2): 409-416
4. Public Health England, 2017. 3.01 - Fraction of mortality attributable to particulate air pollution (2010-15)
5. WHO, 2021. Air Quality Guidelines, Global Update 2021
6. London Inner South Coroner's Court, 2020. Inquest touching the death of Ella Roberta Adoo Kissi-Debrah.
7. Courts and Tribunals Judiciary, 2021. Regulation 28: Report to Prevent Future Deaths (1)
8. https://www.cleanairfund.org/publication/uk-healthy-air/
9. https://www.bmj.com/content/bmj/376/bmj.o677.full.pdf
10. CBI Economics, 2020. Breathing life into the UK economy.

UK Health Alliance on Climate Change

The impacts of air pollution on health

The UK Health Alliance on Climate Change is an alliance of health organisations delivering care across multiple areas of clinical practice, treating patients of all age groups from young babies to the elderly. Health professionals see first-hand the impacts of air pollution on their patients. Here we provide evidence from some of our members on the impact of air pollution on health and why more immediate action to reduce air pollution and improve air quality are needed.

Association for Clinical Psychology – UK, Climate Action Network

A growing body of research shows that air pollution is associated with a broad range of impacts on mental health and psychological wellbeing[1], even when other factors are controlled for. These include:

- Increased symptoms of anxiety[2], , depression and suicide[3,4,5,6]
- Impaired cognitive abilities in adults[7] and children[8]
- and there may even be a risk factor for dementia and other neurological conditions.[9,10,11,12]

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[1] Lu J.G. (2020) Air pollution: A systematic review of its psychological, economic, and social effects. Current Opinion in Psychology. Volume 32, Pages 52-65, ISSN 2352-250X, https://doi.org/10.1016/j.copsyc.2019.06.024.

[2] Power, M.C., Mari Kioumourtzoglou, M., Hart, J.E., Okereke, O., Laden, F., Weisskopf M.G., (2015). The relation between past exposure to fine particulate air pollution and prevalent anxiety: observational cohort study). BMJ, Mar 24;350:h1111. doi: 10.1136/bmj.h1111.

[3] Braithwaite, I. et al. (2019). Air pollution (particulate matter) exposure and associations with depression, anxiety, bipolar, psychosis and suicide risk: A systematic review and meta-analysis. Environ Health Perspect, 127, 12, 126002.

[4] Borronia, E. et al. (2022). Air pollution exposure and depression: A comprehensive updated systematic review and meta-analysis. Environmental Pollution, 292, A, 18245.

[5] Davoudi, M. et al. (2021). Association of suicide with short-term exposure to air pollution at different lag times: a systematic review and meta-analysis. Science of The Total Environment, 771, 144882. 10.1016/j.scitotenv.2020.144882

[6] Liu, Q. et al. (2021). Association between particulate matter air pollution and risk of depression and suicide: a systematic review and meta-analysis. Environmental Science and Pollution Research.

[7] Zhang X, Chen X, Zhang X. The impact of exposure to air pollution on cognitive performance. Proc Natl Acad Sci U S A. 2018 Sep 11;115(37):9193-9197. doi: 10.1073/pnas.1809474115. Epub 2018 Aug 27. PMID: 30150383; PMCID: PMC6140474.

[8] Sunyer J, Esnaola M, Alvarez-Pedrerol M, Forns J, Rivas I, López-Vicente M, Suades-González E, Foraster M, Garcia-Esteban R, Basagaña X, Viana M, Cirach M, Moreno T, Alastuey A, Sebastian-Galles N, Nieuwenhuijsen M, Querol X. Association between traffic-related air pollution in schools and cognitive development in primary school children: a prospective cohort study. PLoS Med. 2015 Mar 3;12(3):e1001792. doi: 10.1371/journal.pmed.1001792. PMID: 25734425; PMCID: PMC4348510.

[9] Chen H, Kwong J.C., Copes R, Tu K, Villeneuve P.J, van Donkelaar A, Hystad P, Martin R.V, Murray B.J, Jessiman B, Wilton A.S, Kopp A, Burnett R.T. Living near major roads and the incidence of dementia, Parkinson's disease, and multiple sclerosis: a population-based cohort study. Lancet. 2017 Feb 18;389(10070):718-726. doi: 10.1016/S0140-6736(16)32399-6. Epub 2017 Jan 5. PMID: 28063597.

[10] Shou Y, Huang Y, Zhu X, Liu C, Hu Y, Wang H. A review of the possible associations between ambient PM2.5 exposures and the development of Alzheimer's disease. Ecotoxicol Environ Saf. 2019 Jun 15;174:344-352. doi: 10.1016/j.ecoenv.2019.02.086. Epub 2019 Mar 5. PMID: 30849654.

[11] Fu, P. & Yung, K.K.L. (2020). Air pollution and Alzheimer's disease: a systematic review and meta-analysis. Journal of Alzheimer's Disease, 77, 2, 701-714. Doi:10.3233/JAD-200483

[12] Salami, F. et al. (2020). Associations between long-term exposure to ambient air pollution and Parkinson's disease prevalence: A cross-sectional study. Neurochem Int, 133, 104615. doi: 10.1016/j.neuint.2019.104615

British Medical Association

The climate emergency is a health emergency. We can see the health impacts of climate change and pollutants on a local level and doctors are already seeing the effects of air pollution and climate change on the health of their patients. Eight out of every 10 (83%) of BMA members responding to a 2019 BMA survey reported being worried about the public health impact of air pollution.

Around 40,000 deaths are directly attributed to air pollution in the UK alone. Air pollution is also a direct contributor to many chronic illnesses, such as respiratory and cardiovascular disease. Unless more is done to improve air quality there will be severe and far-reaching impacts on public health in the future.

Royal College of Obstetricians and Gynaecologists

There is consistent evidence that exposure to particulate matter during pregnancy increases the risk of poor pregnancy outcomes including stillbirth, miscarriage, low birth weight and preterm birth.[13]

In the UK, research has identified links between prenatal, early-life and childhood exposure to road traffic particulate matter and later "small but significant" reductions in lung function during childhood.[14] Evidence also suggests that the risk of term low birth weight increases as maternal exposure to particulate matter increases.[15] Road traffic air pollution in London (with its high urban and traffic density) has been suggested to adversely affect fetal growth.[16]

Inequities in exposure by deprivation can similarly be found in research on adverse pregnancy outcomes, which have also been found to be higher among ethnic minority groups.[17] In order to achieve wider UK Government aims to reduce disparities in maternity outcomes, the final target must take account of these inequities in outcome.

It is extremely concerning that the unique and significant impact of air pollution exposure during pregnancy is not referenced in the consultation documents, including the detailed evidence report and impact assessment.

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[13] RCOG, Outdoor air pollution and pregnancy in the UK (2021); Quenby, S et al., Miscarriage matters: the epidemiological, physical, psychological, and economic costs of early pregnancy loss https://doi.org/10.1016/S0140-6736(21)00682-6 (2021); Guidice, L C et al., Climate change, women's health, and the role of obstetricians and gynecologists in leadership https://doi.org/10.1002/ijgo.13958 (2021)

[14] Hansell, A. et al., Prenatal, early-life and childhood exposure to air pollution and lung function in the UK Avon Longitudinal Study of Parents and Children (ALSPAC) cohort *European Respiratory Journal* (2019)

[15] Chen, Y et al., Trimester effects of source-specific PM10 on birth weight outcomes in the Avon Longitudinal Study of Parents and Children (ALSPAC) *Environ Health* (2021)

[16] Smith, R. B et al., Impact of London's road traffic air and noise pollution on birth weight: retrospective population based cohort study *BMJ* (2017)

[17] Gray, S.C., Edwards, S.E., Schultz, B.D. et al. Assessing the impact of race, social factors and air pollution on birth outcomes: a population-based study. *Environ Health* (2014); UK Health Alliance on Climate Change, Moving beyond the air quality crisis (2018)

Royal College of Paediatrics and Child Health

Exposure to air pollutants during pregnancy and early childhood can have harmful and irreversible effects on the development of the lungs and other organs with the potential for respiratory and other health problems as an adult. Children are more vulnerable than adults to the effects of air pollution because[18]:

- they breathe faster, so they inhale more airborne toxicants in proportion to their weight, than adults exposed to the same amount of air pollution.
- their organs are still forming. Therefore, exposure to air pollutants during pregnancy and early childhood can have harmful and irreversible effects on the development of the lungs and other organs with the potential for respiratory and other health problems as an adult.

The fine particulate matter that pollutes both indoor and ambient air is associated with asthma exacerbations in childhood. Many studies have found that higher exposure to PM and traffic are linked to poorer lung function in childhood, including impaired development of the tracheobronchial tree[19,20,21].

Royal College of Physicians of Edinburgh

The Royal College of Physicians of Edinburgh (RCPE) continues to have significant concerns about the negative impact high levels of air pollution have on the health of people of all ages. Recently we have established a short-term working group to collate the evidence base for reducing air pollution from traffic for children, with a particular emphasis on traffic around schools, and to recommend meaningful interventions.

While there is already a substantial amount of evidence around the effect on children's lung health[22], the RCPE highlights the evidence and research that air pollution can also lead to a diverse range of

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[18] Schraufnagel DE, Balmes JR, Cowl CT, Matteis S De, Jung S-H, Mortimer K, et al. Air Pollution and Noncommunicable Diseases: A Review by the Forum of International Respiratory Societies' Environmental Committee, Part 1: The Damaging Effects of Air Pollution. Chest [Internet]. 2019 Feb 1 [cited 2021 Sep 16];155(2):409. Available from: https://europepmc.org/article/PMC/6904855

[19] Schultz ES, Hallberg J, Bellander T, Bergström A, Bottai M, Chiesa F, et al. Early-life exposure to traffic-related air pollution and lung function in adolescence. American journal of respiratory and critical care medicine [Internet]. 2016 Jan 15[cited 2021 Sep 8]; 193(2): p. 171-7. Available from: **pubmed.ncbi.nlm.nih.gov/26397124/**

[20] Gauderman WJ, Urman R, Avol E, Berhane K, McConnell R, Rappaport E, et al. Association of Improved Air Quality with Lung Development in Children. N Engl J Med [Internet]. 2015 Mar 5 [cited 2021 Sep 16];372(10):905. Available from: **www.ncbi.nlm.nih.gov/pmc/articles/PMC4430551/**

[21] Rice MB, Rifas-Shiman SL, Litonjua AA, Oken E, Gillman MW, Kloog I, et al. Lifetime Exposure to Ambient Pollution and Lung Function in Children. Am J Respir Crit Care Med [Internet]. 2016 Apr 15 [cited 2021 Sep 16];193(8):881. Available from: **www.ncbi.nlm.nih.gov/pmc/articles/PMC4849180/**

[22] Xing, X., et al., *Interactions between ambient air pollution and obesity on lung function in children: The Seven Northeastern Chinese Cities (SNEC) Study*. Science of The Total Environment, 2020. 699: p. 134397. Scarlett, J.F., et al., *Acute effects of summer air pollution on respiratory function in primary school children in southern England*. Thorax, 1996. 51(11): p. 1109-1114. Holst, G.J., et al., *Air pollution and family related determinants of asthma onset and persistent wheezing in children: nationwide case-control study*. BMJ, 2020. 370: p. m2791. Jerrett, M., et al., *Traffic-Related Air Pollution and Asthma Onset in Children: A Prospective Cohort Study with Individual Exposure Measurement*. Environmental Health Perspectives, 2008. 116(10): p. 1433-1438. Nhung, N.T.T., et al., *Acute effects of ambient air pollution on lower respiratory infections in Hanoi children: An eight-year time series study*. Environment International, 2018. 110: p. 139-148.
Khreis, H., et al., *Outdoor air pollution and the burden of childhood asthma across Europe*. European Respiratory Journal, 2019. 54(4): p. 1802194. Bergstra, A.D., B. Brunekreef, and A. Burdorf, *The effect of industry-related air pollution on lung function and respiratory symptoms in school children.* Environmental Health, 2018. 17(1): p. 30. Chen, Z., et al., *The association between high ambient air pollution exposure and respiratory health of young children: A cross sectional study in Jinan, China*. Science of The Total Environment, 2019. 656: p. 740-749.

other negative health impacts including ENT[23] and skin[24]problems, cognition and behavioural challenges[25] and issues with the cardiovascular system.[26]

Achieving cleaner air is also a key part of tackling the climate emergency, as the RCPE and our partners in the Scottish Academy set out in our recent statement on climate change[27]. The RCPE is calling on governments to take decisive action to reduce air pollution levels in communities with reduction targets that are genuinely as ambitious as possible.

Royal College of Psychiatrists

Given the current mortality gap in the UK between those with and without major psychiatric illness[28], at the very least psychiatric patients are likely to be disproportionately affected by mortality and physical morbidity attributable to poor air quality.

There is evidence that air pollution may directly influence adverse mental health outcomes, certainly as far as suicide, dementia and anxiety are concerned. Good quality environmental epidemiological studies have recently started to emerge from across the world outlining a link between suicide and air pollution - particularly pollutants such as fine particulate matter and Nitrogen Dioxide. Recently published research from the Far East[29], Europe[30] and the United States[31] show a small but important effect of short term increases in air pollution on completed suicides.

Anxiety appears to be associated with exposure to high levels of small particulate matter[32], whilst there is increasing evidence that Emergency Department attendances for psychiatric reasons are

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[23] Bowatte, G., et al., *Air Pollution and Otitis Media in Children: A Systematic Review of Literature*. International Journal of Environmental Research and Public Health, 2018. 15(2): p. 257. Eguiluz-Gracia, I., et al., *The need for clean air: The way air pollution and climate change affect allergic rhinitis and asthma.* Allergy, 2020. 75(9): p. 2170-2184.

[24] Lee, Y.-L., et al., *Traffic-Related Air Pollution, Climate, and Prevalence of Eczema in Taiwanese School Children*. Journal of Investigative Dermatology, 2008. 128(10): p. 2412-2420.

[25] Forns, J., et al., *Traffic-related air pollution, noise at school, and behavioral problems in Barcelona schoolchildren: a cross-sectional study.* Environmental health perspectives, 2016. 124(4): p. 529-535. Basagaña, X., et al., *Neurodevelopmental deceleration by urban fine particles from different emission sources: a longitudinal observational study.* Environmental health perspectives, 2016. 124(10): p. 1630-1636. Alvarez-Pedrerol, M., et al., *Impact of commuting exposure to traffic-related air pollution on cognitive development in children walking to school*. Environmental pollution, 2017. 231: p. 837-844. Lopuszanska, U. and M. Samardakiewicz, *The Relationship Between Air Pollution and Cognitive Functions in Children and Adolescents: A Systematic Review*. Cognitive and Behavioral Neurology, 2020. 33(3). Rivas, I., et al., *Association between Early Life Exposure to Air Pollution and Working Memory and Attention*. Environmental Health Perspectives, 2019. 127(5): p. 057002. Roberts, S., et al., *Exploration of NO2 and PM2.5 air pollution and mental health problems using high-resolution data in London-based children from a UK longitudinal cohort study*. Psychiatry Research, 2019. 272: p. 8-17. Yolton, K., et al., *Lifetime exposure to traffic-related air pollution and symptoms of depression and anxiety at age 12 years.* Environmental Research, 2019. 173: p. 199-206. Zhang, M., et al., *Association between exposure to air pollutants and attention-deficit hyperactivity disorder (ADHD) in children: a systematic review and meta-analysis*. International Journal of Environmental Health Research, 2022. 32(1): p. 207-219.

[26] Huang, M., et al., *Effects of Ambient Air Pollution on Blood Pressure Among Children and Adolescents: A Systematic Review and Meta-Analysis.* Journal of the American Heart Association, 2021. 10(10): p. e017734. Ntarladima, A.-M., et al., *Relations between air pollution and vascular development in 5-year old children: a cross-sectional study in the Netherlands*. Environmental Health, 2019. 18(1): p. 50. Mann, J.K., et al., *Traffic-related air pollution is associated with glucose dysregulation, blood pressure, and oxidative stress in children*. Environmental Research, 2021. 195: p. 110870.

[27] https://www.scottishacademy.org.uk/statement-climate-emergency

[28] Berber et al. Reducing the mortality gap in people with severe mental disorders: the role of lifestyle psychosocial interventions. Frontiers in Psychiatry. 2018; 9:463.

[29] Kim et al. Air pollution and suicide in 10 cities in Northeast Asia: a time-stratified case-crossover analysis. Environmental Health Perspectives. 2018 https://doi.org/10.1289/EHP2223/

[30] Casas et al. Does air pollution trigger suicide? A case-crossover analysis of suicide deaths over the life span. European Journal of Epidemiology. 2017 32:973-981

[31] Bakian et al. Acute air pollution exposure and risk of suicide completion. American Journal of Epidemiology. 2015: 181:5

[32] Power et al. The relation between past exposure to fine particulate air pollution and prevalent anxiety: observational cohort study. BMJ. 2015: 350:h1111 doi:10.1136/bmj.h1111

related to high levels of air pollution[33]. Finally, a widely reported[34] study published in the Lancet in 2017 showed a substantial increase in the incidence of dementia in people living close to major roads[35] - the implication being that air pollutants from vehicles were the main mediating factor. Further work from 2020 provides robust evidence around the impact of urban air pollution with interquartile range increases in $PM_{2.5}$, NO_x and NO_2 associated with an increased odds of common mental disorders with psychotic experiences associated only with PM_{10}[36]. Exposure to air pollution during youth, measured by higher levels of outdoor NO_x, has also been identified as a possible risk factor for greater psychopathology at the transition into adulthood [37].

[33] Oudin et al. The association between daily concentrations of air pollution and visits to a psychiatric emergency unit: a case-crossover study. Environmental Health. 2018 17:4 DOI 10.1186/s12940-017-0348-8

[34] https://www.bbc.co.uk/news/health-38506735

[35] Chen et al. Living near major roads and the incidence of dementia, Parkinson's disease, and multiple sclerosis: a population-based cohort study. Lancet. 2017; 389:718-726

[36] Bakolis et al. Mental health consequences of urban air pollution: prospective population-based longitudinal survey. Social psychiatry and psychiatric epidemiology. 2021; 56:1587-1599.

[37] Reuben et al. Association of air pollution exposure in childhood and with psychopathology at the transition to adulthood. Jama Network Open. 2021; 4(4).

Members of the UK Health Alliance on Climate Change are:

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