Reply to Shirley Rodrigues & Imperial College's Environmental Research Group Report on ULEZ

In response to an article in the Telegraph criticising Mayor of London, Sadiq Khan's claims that air pollution causes 4,000 deaths in London each year, London Deputy Mayor for Transport and Energy Shirley Rodrigues replied that '*these figures are from world-leading experts at Imperial College London, and to dismiss them by calling them nonsense is pure science denial*'. (Letter copied below).

In her reply, Rodrigues demonstrates that neither she nor Khan understand the scientific claims, and that in their haste to secure a radical policy agenda, they have failed to consider the full range of scientific arguments. However, the authors of the report from Imperial College on which Khan's claims are based, and other scientific advisors, also bear responsibility for failing to inform the public debate and unwillingness to calm unfounded fears.

Mortality statistics are extremely misleading

London Health Burden of Current Air Pollution and Future Health Benefits of Mayoral Air Quality Policies, purports to be an 'independent' review of the scientific evidence by Environmental Research Group (ERG) - Imperial College London, commissioned by Transport for London (TfL). The report's top key finding is that:

> In 2019, in Greater London, the equivalent of between 3,600 to 4,100 deaths (61,800 to 70,200 life years lost [1]) were estimated to be attributable to human-made PM2.5 and NO2, considering that health effects exist even at very low levels.

and that:

> With the adoption of the Mayor's air quality policies and taking into account general air pollution trends, the average life expectancy of a child born in London in 2013 would improve by around 5 to 6 months.

At face value, this appears to support Khan's claims. However, the report is more cautious (but not sufficiently) about using 'deaths' as a metric to explain mortality risk to the public. It points out that the figure '*of between 3,600 to 4,100 deaths*' is '*equivalent*' to '*61,800 to 70,200 life years lost'.* This 'equivalence' is an extremely controversial and unscientific way of communicating risk.

Had Rodrigues and Khan been keener to understand the science, they would have read footnote 1 in the report, which advises that,

> [1] The original studies were analysed in terms of 'time to death' aggregated across the population. Strictly, it is unknown whether this total change in life years was from a smaller number of deaths fully attributable to air pollution or a larger number of deaths to which air pollution partially contributed. The former is used with the phrase 'equivalent' to address this issue. See COMEAP (2010) for a fuller discussion.

The Committee on the Medical Effects of Pollution (COMEAP) have produced two key documents used variously to make the case for radical air pollution and traffic reduction policies. One is COMEAP 2010, as above, and the other COMEAP 2018, on which the ERG report's methodology is based (as is discussed in more detail below). As we point out in our Together & Climate Debate UK report, COMEAP 2018 explicitly cautions against presenting mortality risk in this way, and that COMEAP had not produced a scientific consensus on its methodology:

> We re-emphasise that while a majority of the Committee considered that calculations such as these are useful, **provided that the caveats and uncertainties are communicated clearly**, a minority thought that they should not be done, partly because they were **not confident that the caveats and uncertainties would be respected**.

The minority view of COMEAP members in the 2018 report stated:

> The mortality burden published in the 2010 COMEAP report has had the desired effect of highlighting the importance of particulate air pollution to the general public. The burden calculation of 29,000 attributable deaths has been widely quoted in the media and other publications despite numerous caveats relating to its meaning and use described in the report. It is clear that qualifying burden estimates with caveats has no influence on how the burden calculations are interpreted and used by others. Furthermore, **there remains widespread ignorance as to what "attributable deaths" mean**.

And that,

> We think it very likely that basing mortality burden calculations on long-term average ambient concentrations of NO_2 will, despite listing caveats, **mislead the public into believing that exposure to long-term average ambient concentrations of NO_2 is causally associated with an increased risk of death.**

The UK Heath Security Agency (Issue 28) also advised caution in presenting mortality risk estimates in terms of 'deaths':

> It should be noted that the annual number of 'attributable deaths' associated with long-term average concentrations of pollutants is **not an estimate of the number of people whose untimely death is caused entirely by air pollution**. Instead, it is a way of **representing the effect of air pollution across the whole population**: air pollution is considered to act as a contributory factor to many more individual deaths. Therefore, it is recommended to use expressions such as, ["]an effect equivalent to a specific number of deaths at typical ages" for the burden estimates (1). In COMEAP's report (2)**, the mortality burden was provided in terms of life years lost as well (328,000 to 416,000); although it is not calculated here, this metric is recommended to be used** as it includes information on the age of population and survival rates considering the air pollution exposure.

As we point out in our report,

> … even expressing the putative equivalence as so many lives prematurely ended by some number of years may still fail to accurately convey the meaning of the UKHSA's mortality risk estimates. The estimate is an attempt to measure the impact of air pollution 'across the whole population'. **The loss of between 328,000 and 416,000 life years to the 55,986,500 population of England, therefore might just as well be expressed as representing a loss of between approximately 51 and 65 hours life per person** of their life expectancy – currently 84.75 years (or 742,410 hours) for a 65 year old in England.

In the recent past, academics involved in air pollution science have made this point on national media. In an interview with Julia Hartley Brewer on Talk Radio in 2017, The late Tony Frew, professor

of respiratory medicine at the University of Brighton and former COMEAP member criticised the politically-motivated presentation of COMEAP's findings:

> **What it meant is that the pollution that happened in 2008 may have meant that you died three days earlier eventually.** That's everybody, assuming that the risk applies to everybody. And this didn't really sound very exciting, so they've sat down and they've said 'well, if we've totted-up all those three-days and put them together, how many lives would it represent?'. And they came up with this figure of 29 thousand equivalent lives that were lost.

The very best that can be said about politicians' and scientists' use of mortality risk estimates is that they are controversial. However, since there is abundant discussion in the scientific literature about the controversy and the weakness of the underlying science that links air pollution with mortality risk statistically, the continued presentation of these mortality statistics without their due caveats required by expert guidance, to imply a causal relationship, can only represent a deliberate attempt to misinform the public.

In her reply, Rodrigues attempts to moralise the observation that air pollution exposure can only be attributed to a statistically insignificant reduction in life expectancy, claiming that, *'It's shocking to see some suggest that because these deaths may be among older people who are more vulnerable to the impacts of air pollution, we don't need to act*'. No such suggestion has been made, and Rodrigues moral argument rests on extremely poor science that she appears not to have understood. This fact is revealed by the proper understanding of the benefits of air-pollution reduction, as determined by COMEAP:

> For a reduction in all traffic-related pollutants, consistent with a 1 μg/m3 reduction of NO_2, about 1.6 million life years could be saved in the UK over the next 106 years, associated with an increase in life expectancy of around 8 days.

Rodrigues claims that to 'dismiss' the ERG report *'is pure science denial'*. However, if 'dismissing' seemingly scientific judgement is 'denial', then it is both Rodrigues herself and the authors of the ERG report that 'deny science' by omitting from their arguments the debate and caveats in the COMEAP report. The debate and the caveats must necessarily have at least as much scientific authority as the ERG report, as the latter report is based on the former.

The Imperial College ERG study was not 'science' and contains no new scientific arguments

As is discussed above, the ERG report draws from COMEAP studies. It is important to note that COMEAP did not do any 'science' as such, but merely reviewed the existing scientific literature. It was asked by the UK government's Department for the Environment and Rural Affairs to attempt to produce a consensus on the association between air pollution exposure and mortality risk. Instead of producing a consensus, COMEAP 2018 produced a report that contained minority and majority views of the committee. Accordingly, the ERG report takes only some of the views of COMEAP on board, and ignores the extremely important scientific debate it presented – exactly what the report warned against doing.

The ERG report itself makes clear that it follows COMEAP's method, stating that, '*This is the first time that the new health impact recommendations (COMEAP, 2018a) have been applied in practice to London's PM2.5 and NO2 concentrations*'. Accordingly, the "findings" of the report offer little more than can be obtained by simply dividing COMEAP's mortality estimates for the UK as a whole by the relative population of London, or any of its boroughs.

To present ERG's report as 'science' is misleading. COMEAP's methodology is statistical and is based on statistical, not causal attempts to identify the relationship between air pollution exposure and mortality risk. Neither report is peer-reviewed or published in scientific journals. COMEAP is a bureaucracy – a panel convened by government to produce guidance, in the form of expert judgement, to inform policy making. The consensus it was asked to produce (but which it failed to find) was necessary because of the broader weakness in the scientific literature and because policymakers had already determined that air pollution-reduction was a policy priority, not because science had detected a significant risk that could in turn be mitigated by policymaking, or because strong cost-benefit analyses suggested it ought to be a priority. On the contrary, as we point out in our report, only extremely small benefits and hypothetical benefits can be realised by significant reductions in air pollution exposure, when compared to other forms of policy intervention – namely, those that emphasise wealth.

The Imperial College study was not "independent"

Though the ERG report states its 'independence', it was commissioned by TfL and the GLA. Moreover, the profiles of its authors on the Imperial College website state explicitly that they have long been very closely involved in policymaking at the global, national and local level, including working directly with the Mayor and his predecessors.

> David Dajnak – "I have worked closely with London policy makers in implementing major changes to the city from the Congestion Charging Scheme (CCS), the Western Extension Zone (WEZ), the Mayor's Air Quality Strategy (MAQS), the Olympic Road Network (ORN), the Low Emissions Zone (LEZ) to the more recent Ultra Low Emissions Zone (ULEZ) and the future London Environment Strategy (LES) and London Environment Strategy Plus (LES Plus)."
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> Sean Beevers – "I have over 15 years' experience in modelling policies aimed at reducing the air pollution exposure of city populations, and have worked closely with London policy makers to implement major changes to the city, from the London Congestion Charging Zone to the recent London Ultra Low Emissions Zone."
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> Heather Walton – "She was involved in the benefits analysis for the cost benefit analysis of the UK National Air Quality Strategy 2007, has worked on quantification of health benefits for the UK Committee on the Medical Effects of Air Pollutants (COMEAP) since 1996 and is now Chair of the COMEAP sub-group on Quantification of Air Pollution Risk (QUARK). She was an invited expert for both the WHO projects 'Review of the Health Aspects of Air Pollution' and on 'Health Risks of Air Pollution in Europe' which set concentration-response functions for cost-benefit analysis of policies in Europe.

Far from being independent, the report's authors are as much responsible for the policies they seem to be evaluating as the policy-makers themselves. This is manifestly an inappropriate way to create and evaluate policy, akin to 'checking your own homework', as critics argue.

Though the authors may be good scientists, even good scientists can both mislead and be misled, and it is for scientific debate to determine what is good science and what is not. As is explained above, the report is not 'scientific'. And the authors, rather than being 'policy neutral', as we would expect scientists to be, seem to have a preference for strict air pollution policies, and demonstrate an ideological leaning towards the green policy agenda.

As we argue in our report, scientific debate and important caveats are lost between various stages of a process of turning science into policy. By omitting the facts, and a full explanation of what is meant by 'deaths' in a statistical context, and thereby failing to explain the limitations of the science, scientists and civil servants, as well as politicians and political activists are complicit in misleading the public.

Shirley Rodrigues. Letters. The Telegraph. 14 February, 2023. Science behind ULEZ

SIR – Questions have been raised by some outer-London boroughs about the scientific evidence showing the number of premature deaths in the capital due to toxic air pollution, and the justification for expanding the ultra-low emission zone ("Khan accused of using 'nonsense data' to make his case for Ulez", report, February 13).

To be clear, these figures are from world-leading experts at Imperial College London, and to dismiss them by calling them nonsense is pure science denial. Toxic air in London is leading to around 4,000 Londoners dying prematurely every year. It's shocking to see some suggest that because these deaths may be among older people who are more vulnerable to the impacts of air pollution, we don't need to act. For the Mayor of London, the impacts on vulnerable communities make the need to act even more urgent.

Some of these councils are not only denying the science, but are contradicting their own Government, as it's data from world-leading experts from Imperial that are used as the basis for national policies to reduce air pollution in other British cities, such as Birmingham and Bristol.

New figures from last week show that the Ulez has had a transformational impact so far, with dangerous emissions dropping by 26 per cent within the existing Ulez area compared to what pollution levels would have been. Everyone has a right to breathe clean air and it would be a dereliction of duty for these Conservative councils to try to deprive their residents of the benefits of being able to breathe cleaner air.

For the Mayor, this is a moral issue. Those in positions of power who are trying to obstruct action to reduce our toxic air are no different from those in the past who argued against legislation to save children from the dangers of tobacco smoke and to the minority today still denying the science around climate change. They will go down as being on the wrong side of history.

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