

I am an air quality scientist at Imperial College London, and I am speaking on behalf of the Nutfield Conservation Society to oppose Gatwick's expansion on air quality grounds.

Particles coming from airports are very small. Most of them are so small that they can reach the deepest parts of the lung and their effects disperse all through the body. They are linked to brain disease such as dementia, to heart disease, asthma, diabetes, and strokes [REDACTED].

The smallest particles cause some of the most significant health problems. Particles produced by combustion in jet engines are typically just 5-15 nanometres and classified as 'ultrafine particles'. They are small enough to enter the body through the lungs and then to essentially all organs, and they can travel up the olfactory nerves to the brain ([REDACTED]). Ultrafine particles increase the risk of all-cause and cancer mortality ([REDACTED]). Ultrafine particles specifically produced at airports were shown to reduce lung function and airway inflammation in individuals with asthma ([REDACTED]). Already, aviation emissions are responsible for an estimated 24,000 early deaths globally every year ([REDACTED]) and an expansion of the airport is likely to increase the number of early deaths and worsen pre-existing health conditions, especially in the neighbouring town of Horley.

Jet engines burn fuel at twice the rate when taking off compared to cruising ([REDACTED]), and around a quarter of all aviation fuel is burnt under 7 km altitude due to taxiing, taking off or landing ([REDACTED]). Fuel burning at these low altitudes creates a toxic particle plume that reaches local residents living under flight paths and in nearby towns and villages.

My colleagues at Imperial College measured the particles in Gatwick's nearest town of Horley, with population 27,000 people ([REDACTED]). They found the particles coming from the airport were much smaller than those coming from other sources in the local area. Expanding the airport will increase the number of ultrafine particles in Horley and this is likely to increase health burden suffered by local residents, where children and the elderly suffer the greatest consequences [REDACTED].

The [World Health Organisation global air quality guidelines 2021](#) defines 'high particle number concentration' over 10,000 particles per cubic centimetre. Ultrafine particles next to LAX runway were measured at over 10,000,000 particles per cubic centimetre ([REDACTED]). This is over 1000 times the WHO definition of a high level. Despite particle numbers from aircraft reducing over the past decade, 2,000,000 particles per cubic centimetre are still recorded at LAX in more recent studies ([REDACTED]). A study from last year measured particles in a town 7 km from Frankfurt airport and found the dominant source of ultrafine particles is from the airport ([REDACTED]). This shows ultrafine particles from airport can pollute nearby towns and villages.

When limits of the ultrafine particles are legislated for, and this will happen, Gatwick will have to run at a lower capacity than it is now. Any expansion will be a huge waste of money and resources. Gatwick's expansion will, as Sir David King said in the Open Floor Hearing on 2<sup>nd</sup> May, become a stranded asset.

Finally, nitrogen dioxide is a polluting gas that comes from airports and the traffic that surrounds them. Nitrogen dioxide is significantly associated with increased death rates and hospital admissions for respiratory disease ([REDACTED]).

You may be aware that DEFRA identified the roads around Heathrow airport as having among the highest illegal levels of NO<sub>2</sub> in the UK even without airport expansion ( [REDACTED] ). Current measurements of Gatwick nitrogen dioxide are 20 micrograms per cubic metre ( [REDACTED] ), whereas the World Health Organisation 2021 guideline is just 10 micrograms per cubic metre. The [Airports Commission report](#) claims the number of properties moving into the 'at risk' category under expansion would be very small, but this is based on a value over three times the WHO guideline.

An expansion of Gatwick would lead to increases in aviation, car traffic, and operations that could push nitrogen dioxide levels above the UK limits. This would not be consistent with the duty of the Secretary of State for Environment, Food and Rural Affairs to meet the limit values in England under the Air Quality Standards Regulations 2010 ( [REDACTED] ).

On planning, the National Planning Policy Framework 2023 states, 'planning decisions should contribute to and enhance the natural and local environment by preventing new development from contributing to unacceptable levels of air pollution' which are defined by the national limits ( [REDACTED] ).

On noise, over 100,000 people living near UK airports, including Gatwick, were studied and significant associations between aircraft noise and adverse health conditions were established ( [REDACTED] ). The average noise over 24 hours, weighted for evening and night noise, provided by the Civil Aviation Authority was linked to higher pulse rates, higher inflammation markers, stiffer arteries, and greater risks of diabetes. This is the largest population-based study to date and the paper concludes that airport noise has 'major public health implications'.

Overall, I believe it would be responsible for Gatwick not to consider expanding due to the health consequences of ultrafine particles and the broader and obvious context of the urgent requirement to scale down aviation in the climate emergency. 2023 was the hottest year on record, and [2024 is even hotter](#). We need to follow the precautionary principle and not wilfully increase pollution we know causes extreme harm locally and globally. You have the opportunity to prevent this expansion and to save lives.