



Joint Statement

NEED FOR AN EU ONE HEALTH-IN-ALL-POLICIES APPROACH: ADDRESSING THE ASTHMA AND ALLERGY PANDEMIC

The One Health Approach is a concept where human health is tightly connected with that of animals and the environment. Bioaerosols (including aeroallergens such as pollen, fungal spores) are fundamental to life on Earth and thus integral to this concept. They have a huge impact on human health, being linked to common diseases such as allergy and asthma, as well as on agriculture, destroying crops and causing environmental damage through the use of fungicides. Just the public health costs are estimated to range between €50-150 billion per year, let alone those related to crop losses. The IPCC has predicted that microbes, including the aforementioned bioaerosols, will be the number one cause of mortality and morbidity in the coming decades. Timely information can reduce these impacts and contribute to effective mitigation strategies across many domains, including human and environmental health as well as agriculture and biodiversity.

The impact of aeroallergens on health

Exposure to aeroallergens, such as pollen and fungal spores, can trigger allergic responses, ranging from rhinitis (commonly known as hay fever) to life-threatening asthma attacks. These diseases are linked with sleep deprivation, impaired mental well-being, and a general reduction in quality of life, often having adverse effects on professional, social, and educational performance. Over 100 million Europeans suffer from allergic rhinitis and/or asthma, making it the most common non-communicable disease for children and the second most common for adults, after heart disease. The associated direct and indirect health costs range between €50-150 billion per year, so even a small reduction in these costs would result in very significant savings.

While there is a large demand for information about aeroallergens, currently it is hard to obtain, it is often inconsistent, scattered, and not available in a timely manner. Partly as a result of this lack of information, the large majority of allergy patients are un- or maltreated. Trusted and reliable information needs to be accessible to the public and integrate both risk levels and mitigation measures. This requires improved monitoring, forecasting, and communication tools.

Changing climate, changing exposure

Climate change has already strongly impacted the lives of allergy patients, as it contributes to earlier and longer pollen seasons, dramatically increased aeroallergen concentrations, and exposure to new mixes of aeroallergens through changing plant distributions. This phenomenon is expected only to accelerate in coming years, as global warming continues to worsen, and more people become sensitised. Furthermore, increased frequency of high temperatures and heat waves, as well as air pollution, are also expected to aggravate respiratory problems, increasing mortality particularly for those suffering from asthma.

Green infrastructure, established as part of climate adaptation strategies may further increase aeroallergen loads and allergic reactions among the sensitised population. Consideration of suitable plant species for urban environments is essential, as is gaining a better understanding of the interaction of aeroallergens with air pollution. Such information is crucial for predicting and mitigating future exposure and the effects of climate change on the allergic population.

Technological breakthroughs

Technological advances in detection and modelling of aeroallergens have made groundbreaking advances over the past five years. Individual bioaerosol particles can now be identified in real-time, compared to conventional methods that typically provided daily average values with delays of up to 10 days. Furthermore, real-time information is now used in forecasts, providing vastly improved information. Importantly for legislation, automated measurement techniques also allow for improved standardisation processes as well as certification that will meet levels similar to what is common in traditional air quality monitoring.

Several regions and countries have established operational real-time monitoring of bioaerosols (currently pollen, soon also fungal spores) and the number of sites and networks is growing continuously. The coordination of the development of this hybrid network of networks is carried out under the framework of EUMETNET AutoPollen, a small, self-funded programme that works closely with other European-funded projects such as SYLVA and SynAir-G as well as the ADOPT COST-Action.

Added value for agriculture, the environment, and research

Beyond human health, real-time bioaerosol monitoring technologies can provide valuable information for agricultural and silvicultural activities. The early detection of pathogenic fungal spores is essential for timely interventions with targeted application of fungicides, which helps to reduce soil pollution and to support biodiversity and related ecosystem services. Additionally, the high temporal resolution that automatic instruments provide will serve as a game-changer in terms of the research possible, whether it be in terms of studying human exposure levels, complex plant dynamics, or the impact of bioaerosols on climate. In addition, fruit production of certain crops (e.g. olives or grapes) can be accurately predicted if the amount of airborne pollen during flowering periods is known.

European legislation: a significant gap

Despite air quality being extensively monitored across Europe, its biological components, including aeroallergens, are largely ignored despite their importance for the health of humans, animals, and the environment. The advent of automatic monitoring that can provide standardised measurements from certified instruments opens the possibility for bioaerosols to be included in European legislation. One way forward would be to recognise aeroallergens as “semi-natural pollutants” that are released into the air from both natural sources (e.g., forests) and human-driven activities (e.g., planted species in cities, agriculture, etc). Recognition of the importance of bioaerosol monitoring at the European level would encourage the emergence of a key information chain, from advanced measurement technologies through to innovative communication tools to inform end-users in a timely manner.

Our recommendations to EU policy makers

Policies need to be introduced to ensure the establishment of a monitoring network that provides real-time information to citizens and relevant stakeholders about bioaerosol levels. This information needs to be made publicly accessible through open and trusted channels. Specifically, this means:

- Improving the legislative framework to include the monitoring of semi-natural pollutants such as aeroallergens (pollen and fungal spores).
- Developing open and trusted communication channels (e.g. through CAMS), that provide reliable, accurate, and timely information about aeroallergen concentrations in real-time.
- Encouraging further research on the effects of pollen and spores on health, including in the presence of other pollutants, based on the new data these efforts will provide.
- Facilitate the development of technology and infrastructure to further extend agricultural applications of bioaerosol monitoring and forecasting.

These measures will help to reduce the disease burden and health inequalities, reduce agricultural losses and environmental damage, and improve our understanding of the complex relationship between exposure, climate, and one health.

About the organisations

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