

Acknowledging the environmental allergy epidemic in children in the UK



The World Allergy Organization (WAO) estimates that allergy prevalence among all age groups is 10–40% globally.¹ Allergic diseases have become more prevalent in high-income countries, an issue that is of increasing concern.^{2,3} The UK has the highest incidence of allergic disease in the world.^{1,2} However, this allergy epidemic has not been given the same level of public and governmental attention as other chronic illnesses, such as cancer or cardiovascular disease.¹ Alongside the emerging allergy epidemic, concern around climate change has been increasing worldwide with the rise in air pollution and toxic emissions from fossil fuel combustion.⁴ Deteriorating air quality in major urban areas has been documented across Europe.^{4,5} The increase in air pollution and incidence of allergies in children in the UK makes understanding the association between these occurrences imperative. This association has been reasonably unexplored in the literature.

In 2000, the burden of diseases from global climate change for all ages amounted to more than 150 000 deaths worldwide, of which roughly 88% were children younger than 5 years.⁶ Air pollution, an element of climate change, is one of the biggest killers of children worldwide.^{7,8} In the UK, allergic diseases are common causes of chronic illnesses leading to deaths of children.¹

Allergic reaction tends to occur when the body's immune system produces IgE antibodies to attack an allergen and protect the body.² Although allergic diseases are common among children, they can also occur in adulthood.² Different types of allergies can result in varying symptoms in different individuals; these symptoms can range from sneezing to more severe reactions such as anaphylaxis.² In the past two decades, hospital admissions from all causes of anaphylaxis increased by 615% in the UK.⁹ Plausible explanations for this increase include genetic factors,² reactions to food,^{2,9} reduced intake of vitamin D and omega-3 fatty acids,¹⁰ and environmental air pollutants.^{4–6}

A major challenge for climate scientists is to predict potential environmental changes over the next few decades and to communicate to clinicians those changes that will presumably affect human health, such as environmental allergies in children.¹¹

In the *Lancet* Commission on pollution and health, Philip Landrigan and colleagues⁸ highlighted that, in 2015, the effects of pollution on planetary health resulted in three times more deaths than from AIDS, tuberculosis, and malaria combined. We hope that the recommendations in this Commission increase the awareness of the general public, government, and policy makers about the effects of air pollution on human health, such as environmental allergic diseases in children.

Research has shown that microscopic concentrations of air pollutants, such as fine particulate matter ($\leq 2.5 \mu\text{m}$ in aerodynamic diameter), are associated with increased respiratory illnesses in children.^{4,6} Children have high skin permeability, resulting in allergic sensitisation via impaired skin barriers.² Hence, young children tend to be susceptible to the effects of toxic air pollutants and climate change.^{4–6,12}

Climate change has resulted in increased global temperatures and greater concentrations of greenhouse gases such as carbon dioxide and ozone in the atmosphere, which have been shown to promote the growth of aeroallergens (eg, pollens such as ragweed and mold) that cause allergic diseases in children.^{4,6} High concentrations of greenhouse gases in the UK's urban areas affect chemical reaction rates and pollutant transport mechanisms.^{4,6} Even in regions with good air quality in rural areas of the UK, changes in air circulation have the potential to modify the long-range transport of pollutants emitted by biomass burning.⁵

The literature on the effects of climate change on allergic diseases in children is still in its infancy, but we believe that the susceptibility of children in the UK to environmental allergies will continue to increase because of rising air pollution. Although only a few health-care advocates and political leaders understand the underlying science well enough to evaluate climate-related proposals with respect to their impact on allergic diseases in children,¹¹ we believe that the *Lancet* Commission should unite researchers, paediatricians, allergy specialists, climatologists, policy makers, and public health professionals not only in the UK, but worldwide. This unity will likely result in establishment

of policies to decrease the incidence of allergies in children in the UK, and possibly set a precedent for other countries to do likewise.

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