

Navigating the complexity of extended allergy seasons



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Spring allergy season is no longer a predictable, time-bound event, and beyond the impacts on the environment, climate change also poses a serious threat to public health.

A review in *Laryngoscope Journal* [1] found that climate change is altering pollen seasons and concentrations, allergic rhinitis (AR) disease prevalence, allergen sensitisation, and AR symptom severity. Projections suggest that pollen emissions could rise by 16–40% [1] by the end of the century, with pollen seasons lengthening by up to 19 days. These changes in the duration and intensity of pollen seasons may lead to increased frequency and intensity of allergy patients' symptoms.

Because of this, clinicians are encountering patients earlier in the season with more complex and overlapping clinical profiles, which can make it difficult to determine the root cause of their symptoms. Clinicians must guide patients to test properly and appropriately to help identify the root cause of their symptoms, and they must work in lockstep with laboratories to tackle the now prolonged season.

Laboratories help by providing clear, objective data that helps clinicians differentiate allergic from nonallergic etiology before symptoms escalate. This insight is critical for ensuring that patients understand and are proactively addressing their symptoms throughout the extended season.

The impact of climate change on respiratory and seasonal allergies

Warmer, earlier springs in turn cause longer growing seasons, which gives plants time to grow and release pollen earlier in the spring and later into fall. A 2026 study in *The Lancet Public Health* found that climate change has extended pollen season in the UK and mainland Europe by weeks since the 1990s, with the pollen seasons for birch, alder and olive trees beginning between one and two weeks earlier in 2015-24 than in 1991-2000 [2]. In North America, the length of pollen seasons increased by an average of 20 days between 1990 and 2018, primarily caused by climate change too.

The impact of climate change on allergies is pervasive, and it's critical for professionals to understand how it impacts not just seasonal allergies, but also on respiratory allergies throughout the year. Rising CO₂ levels also affects mold growth. In molds, higher CO₂ concentrations can lead some species to produce up to three times more spores and twice as many antigenic proteins, increasing the likelihood of allergic reactions and sensitisation. Similarly, elevated CO₂ levels can stimulate plant growth and significantly increase pollen production, particularly in grasses and ragweed. In addition, climate change may affect food allergies, as higher CO₂ concentrations have been associated with increased levels of allergenic proteins in certain foods, such as Ara h1 in peanuts.

Beyond CO₂, air pollutants like ozone, nitrogen dioxide, and particulate matter contribute to increases in allergies by damaging the epithelial barrier, whether it's within the gut, respiratory tract, or even the skin. When this barrier is disrupted by these pollutants, it increases a patient's exposure to allergens and thus, sensitisation probability [3], which can in turn lead to a clinical allergy. One study [4] of children in China found that early-life exposure to high levels of outdoor and indoor air pollution is associated with successive waves of allergy epidemics, with the airway being a new route of food sensitisation in addition to gut and skin.

Climate change is also increasing risk for severe storms and with it, risk of the phenomenon thunderstorm

asthma. This happens when storms cause pollen grains to rupture due to rapid environmental changes, such as increases in humidity and air turbulence. This releases much smaller allergenic particles, which, when inhaled, go deeper into the airways and cause more severe exacerbations of people with allergic asthma that are allergic to these pollens. One severe instance of thunderstorm asthma occurred in 2016 in Melbourne, Australia, where 10 people died and thousands more were impacted [5].

As climate change continues to reshape environmental exposures, the clinical picture is also becoming more complex, with patients increasingly affected by overlapping allergens, infections, and inflammatory triggers rather than a single seasonal driver.

Increasing clinical complexity: polysensitisation, cumulative threshold, and respiratory viruses

Environmental changes are causing more frequent, more severe, and more difficult-to-interpret symptoms. However, while pollen may be a major driver of symptoms during a particularly season, it's often just one part of the problem. 80% of patients with allergies experience polysensitisation, meaning that they're allergic to more than one allergen, and allergens are



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additive [6]. Additionally, the overlap of seasonal pollens, perennial allergens, and even lingering viral infections creates what can be described as a “perfect storm” of respiratory triggers.

Beyond allergies, research suggests that climate change is altering the seasonality and geographic range of viral respiratory infections, with peaks shifting toward warmer seasons and epidemic dynamics becoming increasingly unpredictable [7]. These extended symptom seasons are only increasing the overlap between respiratory viruses and aeroallergen exposure, which includes inhaling airborne particles like pollen, mold, dust mites and pet dander, leading to increased disease burden.

Patients with polysensitisation are particularly complex, since some may reach their symptom threshold only with layered exposures. For example, a patient may have allergies to dust mites and grass pollen, but they don't experience symptoms until the summer, when grass pollen counts are at their highest and push them over their symptom threshold. In this instance, this can make it especially difficult to identify their other allergy to dust mites and create a truly effective symptom management plan where they reduce exposure to all their allergic triggers.

When seasonal pollens are added into the mix, they can layer on top of that perennial exposure. If a patient also recently had a viral infection, the inflammation from that infection can further lower their symptom threshold. This layered phenomenon is why patients often blame the most

visible allergic trigger, like spring pollen season, when year-round allergens or residual inflammation may be contributing equally to their symptoms.

Allergy is a cumulative threshold disease, meaning that simultaneous exposure to multiple allergens (like dust mites, pets, or mold) can worsen symptoms and make asthma more difficult to manage. For example, a patient may already have an asymptomatic baseline inflammation from perennial allergens like dust mites or pet dander or increased airway inflammation from a recent viral infection, but when pollen season begins, that additional trigger can push them over their symptom threshold.

This layered exposure creates diagnostic ambiguity and makes it risky to rely on seasonality alone, and because of this, physicians should be mindful of how potential perennial allergies are contributing to patients' symptoms during their assessment, as well as any lingering symptoms caused by viral respiratory infections.

Laboratories' role in enabling early proactive management

Laboratory diagnostics play a critical role in shifting healthcare from reactive to proactive care, and as the increased clinical complexity of patients translates into the need for structured, stepwise testing strategies that can adapt to evolving clinical questions. Laboratories are no longer simply performing isolated tests; they are integrating multiple data points to build a comprehensive diagnostic narrative, often under considerable time pressure.

Specific IgE tests provide critical support during the prolonged pollen seasons by offering objective insights that complement clinical evaluation, which includes a thorough gathering of a patients' clinical history. Enabling clinicians with advanced diagnostic tests in their laboratory setting helps them understand when a patient is sensitised to one or more allergens, helping the clinician provide precise and effective symptom management recommendations.

Specific IgE tests also equip clinicians with the

The right diagnostic approach can help shift allergy management from reactive to proactive care.

capability to focus on the most prevalent allergens in the patient's geographical region, as clinical laboratories provide region-specific environmental allergen profiles that enable professionals to obtain complete allergy trigger assessments efficiently. This comprehensive allergy testing allows clinicians to move beyond symptom patterns and seasonal assumptions to identify the specific sensitisations driving their patient's disease.

Creating a new standard for seasonal allergy care

As the environment continues to change, drive exposure to new allergens and increase existing sensitisations, prioritising early and accurate allergy diagnosis can help patients avoid unnecessary exposure to allergens and proactively address their symptoms, reducing the severity of their allergic symptoms and contributing to less unnecessary urgent care or emergency department visits.

As allergy seasons become longer and more intense, clinicians and laboratory professionals must work in lockstep. The right diagnostic approach can help shift allergy management from reactive to proactive care, ensuring better patient outcomes and improved quality of life. Specific IgE testing is an important tool in this approach, helping to identify sensitisation patterns and support more accurate and personalised allergy management.

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She holds a degree in Biotechnology from the Autonomous University of Barcelona and a PhD in Molecular Biotechnology from the Polytechnic University of Catalonia. Before moving into the diagnostics industry, she worked as a postdoctoral researcher, developing a strong background in laboratory research and translational science.

In her current role, she collaborates closely with clinicians, laboratories, and key opinion leaders across Europe, supporting scientific education and evidence-based use of diagnostic tools in allergology and autoimmunity. She has contributed to congresses, educational programmes, advisory boards, and peer-reviewed scientific publications, and currently leads the European scientific advisor team.



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