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Pathology: the science behind the cure

Health inequalities in allergic disease: a pathology perspective

Nicola Jay explains the pathologist's role in resolving allergy inequalities.

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Allergic disease is usually discussed in clinical terms – asthma, rhinitis, eczema, food allergy, drug allergy and anaphylaxis. But for pathology services, it is also a diagnostic, stewardship and data challenge.

Many clinical and non-clinical healthcare professionals will have to consider atopy – an inherited condition that causes exaggerated immunoglobulin E (IgE) immune responses – in their daily work but often don't understand the breadth of the specialty or the impact on morbidity and mortality. It is common, chronic and relapsing, with effects that extend from infancy into adult life. It contributes to primary care workload, urgent and emergency attendances, hospital admissions, prescribing, antimicrobial use and avoidable morbidity.

Yet, access to accurate diagnosis, specialist interpretation and disease-modifying care remains uneven across the UK.[1–3] For pathology, allergy-related health inequalities are therefore not peripheral: they shape who is tested, how results are interpreted, whether inaccurate labels are corrected and whether laboratory data is used to improve population health.

Why allergy inequality matters to pathology

Health inequalities are avoidable, systemic differences in outcomes or access between groups and places. In allergic disease, they arise along the whole pathway: prevention, symptom recognition, referral, laboratory investigation, diagnosis, treatment, monitoring, emergency care and daily safety in schools, workplaces, travel and food environments, and also investigation into mortality.

Pathology is embedded in many of these elements. Specific IgE testing, component-resolved diagnostics, tryptase, eosinophil counts, inflammatory biomarkers, histological assessment, microbiology results and drug-allergy documentation can all affect clinical decision-making. If access to these tools is inconsistent, or if results are not interpreted in clinical context, inequity is reinforced rather than reduced.

Allergy is especially vulnerable to inequality for 3 reasons. First, exposures that influence risk and severity, including damp housing, indoor allergens, air pollution and occupational triggers, are not evenly distributed. Second, specialist allergy and immunology services are scarce and geographically concentrated, so access often depends on postcode, transport, time off work and the capacity to persist through complex referral systems.[2,3] Third, safe allergy management requires sustained self-management, health literacy, reliable information and trust in services. Patients facing language barriers, poverty, disability, insecure work or previous discrimination may encounter greater difficulty at every stage.

Diagnostics, interpretation and misdiagnosis

One of the central equity questions for pathology is not simply whether tests exist, but whether they are available, appropriate and meaningful. Allergy tests are vulnerable to both underuse and overuse. A patient with convincing immediate reactions may never reach testing because referral pathways are blocked, while another may receive broad panels without adequate clinical correlation, generating false reassurance, unnecessary avoidance or anxiety.

The Royal College of Pathologists' 2025 best practice recommendations emphasise that laboratory allergy testing should be guided by clinical history, including symptoms, timing, likely allergen and reproducibility.[4] Laboratories and clinicians therefore need pathways that support targeted testing, interpretive reporting and clear advice about the limits of sensitisation tests.

Drug allergy shows the pathology contribution particularly clearly. Many people carry inaccurate penicillin allergy labels. These labels are not benign: they can lead to broader-spectrum antibiotic use, poorer infection outcomes, increased healthcare costs and antimicrobial resistance pressures. Penicillin allergy de-labelling is therefore both an allergy and antimicrobial stewardship intervention. The British Society for Allergy & Clinical Immunology (BSACI) guidance supports risk stratification and, for suitable low-risk patients, de-labelling or supervised oral challenge delivered by trained non-allergists in hospital settings.[5] Pathology services, infection teams, pharmacists and electronic records teams all have a role in making the label accurate, visible and transferable across care settings.

Unequal burden and avoidable harm

Allergic disease reflects interactions between immune development, genetics, infection, epithelial barrier function and environment. Early childhood is a critical period, and allergic conditions frequently cluster; eczema, food allergy, rhinitis and asthma often coexist. For families with fewer resources, managing multiple conditions can mean repeated appointments, medicines, dietary restrictions, school negotiations and emergency planning. If diagnostic access is delayed, the practical and psychological burden increases.

Evidence on food allergy prevention illustrates both opportunity and risk. The Learning Early About Peanut Allergy trial showed that early peanut consumption in high-risk infants substantially reduced peanut allergy by 5 years of age.[6] Follow-up data suggests sustained protection beyond the intervention period.[7] However, implementation may be inequitable if advice assumes stable routines, confidence, time, culturally appropriate guidance and ready access to clinical support. Similarly, atopic dermatitis outcomes are shaped not only by biology but also by housing, stress, access to treatment and the ability to maintain long-term care plans. Ethnicity, deprivation, disability, neurodiversity and language may intersect to shape whether people are believed, referred and supported.

When allergy care fails, outcomes can be severe. Anaphylaxis, uncontrolled asthma, severe eczema and recurrent reactions can lead to avoidable emergency attendances, admissions, systemic corticosteroid exposure and preventable death. The National Child Mortality Database thematic report on deaths due to asthma or anaphylaxis highlights preventable factors and the relationship between the worst outcomes and health inequalities.[8] From a pathology perspective, this underlines the need for reliable diagnostic pathways, timely availability of relevant tests, accurate coding, investigation after severe reactions and better linkage between laboratory data and clinical outcomes.

Access to specialist care and disease-modifying treatment

The UK has limited specialist allergy provision, with adult services particularly constrained and unevenly distributed. Recent analysis from the BSACI Registry for Immunotherapy reported substantial geographical, socioeconomic and ethnic variation in access to immunotherapy and related specialist care.[3] Participants were clustered around specialist centres; people from the most deprived areas were under-represented, and White participants were more likely to be referred directly from primary care than people from Asian, Black, mixed or other minority ethnic groups.[3] This matters because immunotherapy, biologics and other specialist interventions can alter disease trajectory for selected patients, rather than simply treating symptoms.

Pathology services can help reduce this postcode effect by supporting networked models of care. Standardised test repertoires, shared interpretive guidance, reflex testing where appropriate, electronic advice, remote multidisciplinary review and agreed referral thresholds

can bring specialist expertise closer to patients. However, this must be designed carefully. Digital systems can improve access, but may exclude people without reliable internet, digital confidence or English-language resources. Equity requires multiple routes into care and information in formats that patients and professionals can use.

Data, surveillance and pathology leadership

A major barrier to equitable allergy care is the absence of robust, linked data. Pathology is central to solving this. Laboratory systems hold information on patterns of testing, positive results, repeat testing, tryptase use after suspected anaphylaxis, eosinophilia, microbiology consequences of antibiotic allergy labels and regional variation in access. The National Allergy Strategy calls for stronger leadership, standards and surveillance, combined with a National Allergy Register.[1,2] This data can support service planning only if it is standardised, coded and linked to clinical outcomes in ways that are safe, ethical and useful.

Pathologists also have an educational role. Many frontline clinicians receive limited allergy training, yet make decisions about testing, prescribing, referral and emergency management every day. Laboratory reports that include concise interpretation, clinical caveats and signposting can reduce error. Joint education with primary care, emergency medicine, paediatrics, dermatology, respiratory medicine, pharmacy, microbiology and immunology can build shared competence. In drug allergy, pathology-led collaboration with antimicrobial stewardship teams can convert an inequitable specialist bottleneck into a scalable safety programme.

Implications for the National Allergy Strategy

For pathology, the National Allergy Strategy goals should be read as a call to action. Policy must recognise allergy as a long-term condition requiring diagnostic infrastructure, not simply specialist clinic capacity. Equitable healthcare access requires minimum expectations for testing, interpretation, referral and follow-up across regions. Prevention must include implementation support for underserved families, not only evidence summaries. Education must improve allergy capability across the whole workforce, including laboratory-facing clinicians. Research must include implementation science, diagnostic accuracy, service evaluation and equity metrics.

In summary, inequalities in allergic disease are produced by both social determinants and service design. Pathology cannot resolve them alone, but it has levers that are essential: accurate diagnosis, interpretive expertise, antimicrobial stewardship, data linkage, surveillance, education and quality assurance. If these levers are applied consistently and equitably, pathology can help move allergy care from crisis response towards prevention, precision, safety and inclusion.

References available on our website.

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