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# Tackling antimicrobial stewardship, health inequalities and spurious penicillin allergy labels in the UK

Rashmeet Bhogal and colleagues from the University of Birmingham discuss antimicrobial resistance inequalities in the UK.

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**The global rise in antimicrobial resistance (AMR) continues to be one of the leading causes of human death.[1–3] Bacterial AMR was associated with approximately 5 million deaths in 2019 and 2021.[1,2] Health inequalities disproportionately increase the risk of AMR, often seen in low- and middle-income countries,[4] but also starkly evident within the UK.**

# Introduction

Data from the UK Health Security Agency's English surveillance programme for antimicrobial utilisation and resistance (ESPAUR) 2024–2025 report[5] demonstrates that individuals residing in the most deprived areas experience a 47.2% higher rate of antibiotic-resistant bloodstream infections than those in the least deprived areas. Furthermore, ethnic disparities persist, with a significantly higher burden of AMR bloodstream infections observed among Asian and British Asian populations compared to White individuals.

**Box 1. Summary of key points for clinicians.**

**1. Spurious penicillin allergy labels (PALs) may enhance the risk of AMR, which disproportionately affects ethnic minority and socially deprived populations.**

**2. Approximately 5.6% of the population carries a PAL, yet <5% of these represent true hypersensitivity, leading to unwarranted use of second-line antibiotics which may have broader spectrum and/or higher toxicity.**

**3. Inaccurate PALs are linked to poorer clinical outcomes, including increased risks of *Clostridioides difficile* infection, methicillin-resistant *Staphylococcus aureus* infection, vancomycin-resistant *Enterococci* infection, surgical site infections and prolonged hospital stays.**

**4. Validated decision tools (e.g. PEN-FAST) and UK trials (SPACE, ALABAMA) demonstrate that patients with a low-risk PAL can safely undergo a direct oral penicillin challenge administered by a trained non-allergy healthcare professional (HCP).**

**5. Sustainable integration of penicillin allergy de-labelling (PADL) into routine practice requires formalised credentialing of non-allergy HCPs (e.g. clinical pharmacists), supported by the UK National Allergy Strategy.**

# UK AMR national action plan and acknowledgement of PADL services in the UK

The UK National Action Plan for AMR outlines ambitions for embedding good antimicrobial stewardship principles into routine clinical practice.[3] 'Optimising the use of antimicrobials' is theme 2 of the plan, which acknowledges the importance of the provision of PADL services in the UK.[3]

National and local antibiotic guidelines are encouraged to align with the UK Access, Watch and Reserve, and Other (UK-AWaRe) antibiotic framework,[6] whereby antibiotics from the 'Access' group should be used as first-line therapy instead of the 'Watch' and 'Reserve' categories.[6] Penicillin antibiotics feature in the 'Access' group,[6] which further reinforces their place in first-line antimicrobial treatment options.

It is estimated that approximately 5.6% of the general population in England have a PAL.[7] A PAL may result in prescription of second-line antibiotics. These are often less desirable for a number of reasons, which may include, for example, a broader spectrum of activity, increased risk of adverse effects or lack of evidence base for their use.[7–10] Published evidence suggests that fewer than 5% of PALs represent true type I or type IV hypersensitivity.[7,11,12] Inaccurate PALs enhance the risk of *C. difficile*, methicillin-resistant *S. aureus* and vancomycin-resistant enterococcal infections, increase the risk of surgical site infections, and increase the length of hospital stays.[7,8,13]

# Current standard of care

The standard of care for penicillin allergy is led by specialist allergy and immunology services in the UK NHS.[10] Penicillin allergy evaluations are onerous and involve systematic history-taking and allergy skin tests and, if negative, are followed by a supervised oral penicillin challenge.[10] There is a huge unmet demand for drug allergy services in the UK, and penicillin allergy tests are only available in a few hospitals. Drug allergy services in the UK are overwhelmed, with the greatest disadvantage seen in patients with a lower socioeconomic status.[10,14,15]

Patients with a PAL can be stratified into 'low risk' and 'high risk' based on clinical history. Published evidence suggests that 40–60%[11,16,17] of PALs are low risk. Low-risk patients can undergo a direct oral penicillin challenge without the need for allergy testing. Recent studies have shown that risk stratification and direct oral penicillin challenge in low-risk patients can be safely undertaken by trained non-allergy healthcare professionals, such as clinical pharmacists, nurses and general physicians in secondary care.[10–12,16,18] The British Society for Allergy & Clinical Immunology guidelines[10] outline the key considerations when setting up this service. However, there are no dedicated resources in the NHS for training and developing non-allergy healthcare professionals in PADL, for enhancing public understanding of the impact of inaccurate PALs, or for embedding this intervention into routine clinical pathways.

# The status quo with tackling spurious PALs

In the last 10 years, there has been a proliferation of toolkits for PADL, some of which have been tested in the UK. There is considerable heterogeneity in risk stratification and direct oral penicillin challenge protocols.[11,12,16–20]

The Scottish Antimicrobial Prescribing Group developed one of the first structured toolkits for use by non-allergy healthcare professionals, which incorporated risk stratification algorithms, oral challenge protocols, patient information resources, adverse reaction management guidance and communication templates for primary care.[19]

The PEN-FAST clinical decision rule has provided a validated, simple risk-stratification tool to identify low-risk patients suitable for a direct oral penicillin challenge, facilitating broader implementation in non-specialist settings.[17] The UK SPACE study further demonstrated the feasibility and safety of a direct oral challenge delivered by trained non-allergy HCPs, with 97% of challenged patients successfully de-labelled and no serious allergic reactions reported.[11] The ALABAMA trial evaluated a pathway wherein patients with a PAL in primary care were referred to secondary care allergy clinics for risk stratification, enabling the successful de-labelling of both low- and high-risk individuals.[12]

Clinically, this structured approach proved safe and highly effective at removing incorrect PALs, thereby optimising subsequent patient management by facilitating a return to appropriate, first-line penicillin prescribing.[12] Similarly, the REPeAL programme and multiple US studies have shown that pharmacist-, physician- and nurse-led pathways can safely expand access to PADL services.[18,20]

A primary bottleneck in embedding PADL service into routine clinical practice is the absence of a standardised, competency-based pedagogical framework for non-allergy healthcare professionals. While toolkits exist, sustainable implementation requires training and even possibly formalised credentialing.

# UK National Allergy Strategy ambitions

The UK National Allergy Strategy provides the first coordinated national framework for improving allergy prevention, diagnosis, management, workforce development and patient safety across the UK.[14] Although it does not specifically mandate PADL services, many of its recommendations directly address barriers that currently limit implementation of drug allergy services.[14] The strategy calls for stronger allergy leadership, improved workforce planning, equitable access to specialist and community services, enhanced education and training, national standards, data collection and integration of allergy expertise into NHS policy and service development. These measures could provide the infrastructure needed to support widespread PADL services.

The National Allergy Strategy is timely and will support the implementation of research findings towards establishing successful PADL services across the UK.[14] The emphasis on workforce development and service standardisation could support the creation of nationally recognised pedagogical and competency-based training programmes for non-allergy healthcare professionals, and help establish sustainable, equitable PADL services across the NHS.[21,22]

However, dedicated national commissioning, implementation support and educational infrastructure will still be required if the full benefits demonstrated in current research are to be realised.[14,21,22]

Inaccurate PALs are no longer solely an allergy and immunology concern; they are a critical bottleneck in antimicrobial stewardship and a quiet driver of health inequalities across the UK. It is time to move PADL out of overwhelmed specialist pathways and into routine, multidisciplinary practice to ensure that every patient has equitable access to first-line, evidence-based antimicrobial chemotherapy.

Future implementation must be paired with targeted research into de-labelling efficacy among ethnic minority cohorts, to guarantee that the rollout of these services delivers truly equitable clinical outcomes across the UK.

References available on our website.

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