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POSITION PAPER

Adult penicillin allergy programmes in Australian hospitals: a practical guide from the National Antibiotic Allergy Network

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Abstract

Penicillin allergy is a significant burden on patient, prescribing and hospital outcomes. There has been increasing interest in the incorporation of penicillin allergy testing (i.e. delabelling) into antimicrobial stewardship (AMS) programmes to reduce the burden of penicillin allergy labels and improve prescribing. In particular, there has been a focus on point-of-care penicillin allergy assessment and direct oral challenge for low-risk phenotypes. The National Antibiotic Allergy Network has provided a guide to assist AMS clinicians with the incorporation of penicillin allergy programmes, in particular direct oral challenge, into Australian hospitals.

Introduction

Patient-reported penicillin allergies, so-called penicillin allergy labels (PALs), are a high burden in Australian healthcare, with more than 9% of all inpatients reporting such a label.[1] In the Australian and global setting, these have been associated with inappropriate prescribing, broad-spectrum antibiotic utilisation, poor patient outcomes and antimicrobial resistance.[1–5] This is despite the vast majority of PALs being low-risk phenotypes (e.g. childhood rash), typically amenable to direct oral challenge (DOC),[6] with extensive local and international literature supporting the safety of this approach.[7,8]

Penicillin allergy has been seen as a target for antimicrobial stewardship (AMS) programmes,[9] supported by national and international AMS policy and guidelines.[10–12] In fact, the Australian Clinical Care Standards for AMS

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include a Quality Statement on Adverse Reactions to Antimicrobials for the hospital setting.[13] The World Health Organization (WHO) AMS interventions practical guide highlights that the rationale for implementation of penicillin allergy delabelling in hospitals is to improve first-line antibiotic use, reduce antibiotic adverse drug reactions (ADRs), reduce inpatient length of stay, improve antibiotic allergy assessment and save healthcare costs.[12] In prospective cohort studies, inpatient penicillin allergy delabelling programmes have been demonstrated to lead to increased utilisation of narrow-spectrum penicillins, reduced restricted antibiotic prescribing, increased antibiotic appropriateness and cost savings.[6,14,15]

This guideline therefore seeks to provide guidance for clinicians, particularly those involved in AMS programmes, who seek to deploy penicillin allergy assessment and delabelling in the inpatient hospital setting.

Objective

The objectives of the guide are to provide a practical approach to inpatient penicillin allergy assessment and delabelling programmes and to promote the safe and effective use of penicillins and beta-lactams in patients with a PAL. The guide utilises the available evidence and the experience of the multidisciplinary steering committee from the National Antibiotic Allergy Network (NAAN).

Target audience

The target audience includes primarily hospital AMS providers who are planning to implement one or more penicillin allergy interventions in the hospital setting.

Methods

The NAAN is a group of multidisciplinary clinicians seeking to support the implementation of antibiotic allergy programmes into Australian healthcare. The steering committee has representation from all states and jurisdictions, the AMS Jurisdictional Network, and specialist disciplines, including allergy and immunology, AMS, infectious diseases and pharmacy. The manuscript was developed from a literature search and narrative review using key word search terms: ('delabelling' OR 'antibiotic allergy' OR 'penicillin allergy') AND ('inpatient' OR 'hospital' OR 'antimicrobial stewardship'), identifying studies performed between 2000 and 2024. Current peak society guidelines and local health authority publications were also identified and reviewed, where appropriate. A writing committee (RH, EM, CHK, JAT) was established to provide a draft manuscript for the wider NAAN steering committee to review. Recommendations were summarised and presented, and line-by-line review was undertaken by the NAAN steering committee with 15 members present, during which consensus recommendations were achieved. Following feedback from the NAAN steering committee, a revised manuscript was provided to the peak AMS bodies for review, comment and endorsement, including the Healthcare Infection Control Special Interest Group from the Australasian Society of Infectious Diseases, National Centre for Antimicrobial Stewardship, Advanced Pharmacy Australia (formerly Society of Hospital Pharmacists of Australia) and the Therapeutic Guidelines.

Key definitions required for understanding penicillin allergy programmes

The key definitions required for the implementation of penicillin allergy programmes and to avoid confusion or ambiguity among stakeholders is provided in Table 1.[4,9,16–18]

Barriers and facilitators to implementation of penicillin allergy programmes

There are potential barriers and facilitators to the implementation of penicillin allergy programmes in the inpatient setting. Some of the commonly encountered and modifiable barriers and facilitators identified in the literature are described in Table 2 with proposed solutions.

Practice guide

It is important for clinicians commencing inpatient PAL delabelling programmes to

- Understand their local barriers and enablers.
- Leverage identified themes from previous international and local implementation experiences.
- Ensure the existence of an endorsed clinical delabelling protocol, with simplified procedures and practices that focus on low-risk and stable patients.

Models of penicillin allergy care in the hospital setting

A variety of inpatient and ambulatory models of penicillin allergy assessment and delabelling have been reported in the literature, with the majority (>50%) being multidisciplinary in nature,[25] and a predominance of allergist, pharmacist and infectious diseases performing the PAL assessment.[25] A recent meta-analysis and systematic review by Powell *et al.* demonstrated that delabelling by non-allergists is efficacious and safe.[26] These data support

Table 1 Definitions of terms used in the delivery of penicillin allergy programmes

Term	Definition
Penicillin allergy label (PAL)	Patient-reported penicillin allergy, irrespective of immunological or non-immunological mechanism.
Antibiotic allergy label (AAL)	Patient-reported antibiotic allergy, irrespective of immunological or non-immunological mechanism.
Delabelling (delabeling)	Removal of a PAL or AAL following medical reconciliation and/or allergy testing (such as a skin test or direct oral challenge)
Direct delabelling	Removal of a PAL or AAL following medical reconciliation alone. Frequent examples include (i) prior proven tolerance to implicated penicillin (since the time of reported reaction); (ii) a PAL or AAL based upon family history alone; and (iii) where the reaction associated was consistent only with a benign non-immunological reaction (e.g. isolated gastrointestinal upset).
Direct oral challenge (DOC)	Performing an oral challenge or provocation, single dose or multistep, without prior skin testing.
Desensitisation	Temporary induction of tolerance to a sensitised drug by administering slow increments of the drug, starting from a very small amount to a full therapeutic dose.
Low-risk penicillin allergy	PAL that represents a phenotype unlikely to be reproducible on oral challenge with or without prior skin testing and not associated with severe or life-threatening symptoms or signs.
High-risk penicillin allergy	PAL that represents a phenotype either likely to be reproducible on oral challenge with or without prior skin testing or phenotype where the potential morbidity or mortality from re-exposure is significant (i.e. anaphylaxis, severe cutaneous adverse drug reactions).
Anaphylaxis	Anaphylaxis is a serious systemic hypersensitivity reaction that is usually rapid in onset and may cause death. Severe anaphylaxis is characterised by potentially life-threatening compromise in breathing and/or circulation and may occur without typical skin features or circulatory shock being present.
Severe cutaneous adverse reactions	A group of severe presumed T-cell-mediated delayed hypersensitivities – Stevens-Johnson syndrome, toxic epidermal necrolysis, drug reaction with eosinophilia and systemic symptoms and acute generalised exanthematous pustulosis.

Table 2 Barriers to implementation of penicillin allergy programmes

Barriers to implementation	Proposed solutions/enablers
Hospital framework and support	• Utilise an evidence-based approach focussed on stable ward patients, with hospital executive support to improve healthcare worker confidence.[7,19] • Allergist support should be considered for determining approaches to complex penicillin allergy phenotypes.[20]
Stakeholder time pressures[20,21]	Busy clinicians are more engaged when the PAL impacts current antibiotic needs. Proposed solutions by end-users include the following[20]: • Utilise an acute antibiotic need as a driver for penicillin DOC. • Reduce observation times after DOC. • Ensure there is a named leader or champion for delabelling.
Patient acceptance and prevention of relabelling	Relabelling is noted to be higher in patients who have had direct delabelling compared to DOC[22] and in those who have not been provided written confirmation of their delabelling.[23] Patient acceptance of delabelling and reduced rates of relabelling are optimised when • The benefits of delabelling are clearly explained.[22,24] • DOC is utilised when feasible. • Written communication is provided after testing. Consider using NAAN-developed and consumer-approved consumer information sheets (Appendix S1).
Facilitators to implementation	**Drivers**
National standards for accurate and complete documentation of adverse reactions to antimicrobials in the medical record.[13]	The AMS Clinical Care Standards advocate for quality documentation, including the active ingredient, date, nature and severity, of an adverse reaction to any antimicrobial in the healthcare record. These standards support Hospital Accreditation Frameworks to promote safe and appropriate antimicrobial prescribing.[13]
Utilisation of penicillin allergy delabelling as a method for improved antibiotic appropriateness	National and international AMS guidelines and guides,[10,12] support the use of penicillin allergy delabelling as an effective tool for improved antibiotic appropriateness and narrow-spectrum penicillin utilisation.

a multidisciplinary model,[19] noting the importance of utilising an engaged workforce with expertise and motivation, irrespective of discipline.[20]

A recent state-wide initiative led by Safer Care Victoria implementing inpatient penicillin allergy programmes across 12 hospitals demonstrated the following factors as

drivers for successful programme implementation: AMS involvement (75%), utilisation of a validated antibiotic allergy assessment tool[27] or clinical decision rule (PEN-FAST) (83%)[28] and DOC completion via a hospital-approved protocol (97%).[29,30] Engaging consumers in the process of DOC and delabelling is an increasing focus. Loprete *et al.* in a New South Wales experience demonstrated that written communication to patients improved short-term patient perception of beta-lactam allergy status.[23] Examples of NAAN endorsed written communication for consumers and clinicians are provided in Appendix S1.

Considering the focus on hospital AMS outcomes, only those models appropriate to the inpatient care setting are discussed in this practice guide. These models have been separated into *whole-of-hospital* approaches and *selected* delabelling models. Proposed future models of inpatient penicillin allergy delabelling may include a decentralised service, supported by education, whereby activity is less reliant on AMS programmes.

Whole-of-hospital delabelling

A penicillin allergy delabelling programme supported by the Victorian Department of Health was piloted at two Victorian centres in 2019–2020.[6] As part of this programme, daily assessment and review of all inpatients reporting a penicillin allergy in the Electronic Medical Record (EMR) system was undertaken (Monday–Friday). A delabelling strategy was offered to appropriately assessed low-risk patients who met predefined inclusion and exclusion criteria.[6] This programme was successful in delabelling 29% of patients assessed, with 97% negative on DOC.[6] A similar programme of prospective assessment was performed in New Zealand, with a higher conversion of assessment to delabelling (71%) and equivalent safety profile (91% negative on DOC).[31] Similar findings were noted in a study undertaken by internal medicine clinicians in Norway, with 63% of patients who were assessed as low-risk proceeding to DOC.[32] Such programmes are advantageous in reach and are more likely to meet the recommended antibiotic allergy documentation criteria in the healthcare record, according to the AMS Clinical Care Standard.[13] However, they remain resource intensive and are difficult to implement in hospitals without an EMR, and the conversion from assessment to delabelling is often incomplete.

Selective delabelling

In contrast to whole-of-hospital programmes, selective delabelling strategies can be deployed, including opportunistic (i.e. no acute therapeutic penicillin requirement) and targeted (i.e. acute therapeutic penicillin requirement) programmes. AMS-led penicillin allergy rounds have been described in the local Australian literature to perform both aforementioned described methods – using a post-prescription format directed by an EMR custom list of PAL patients with/or without current antibiotic utilisation and criteria-led DOC – resulting in improved prescribing and delabelling opportunities.[33,34] The rounds in these models typically were weekly and multidisciplinary (i.e. pharmacist and clinician), offered penicillin allergy assessment and direct delabelling and DOC (where applicable) and focussed on antimicrobial prescribing.[15,35]

(i) **Opportunistic delabelling:** Providing delabelling to an inpatient not acutely requiring a penicillin has greatest support in frequent users of antibiotics (e.g. immunocompromised) and perioperative settings.[36,37] However, outpatient models are more successfully and frequently reported in patients not actively requiring antibiotics.[38–41] In an Australian multicentre cohort study by Trubiano and colleagues, patients who were opportunistically delabelled during an inpatient admission and likely to receive a penicillin in the 12 months after DOC were those who were admitted with an infective episode or on a surgical admission or who were immunocompromised.[36]

(ii) **Targeted delabelling:** The literature, both locally and internationally, has greater volume of penicillin allergy assessment being performed in targeted settings, for example, infective episode or current antibiotic utilisation.[25] Internationally, Ramsey and colleagues utilised an AMS pharmacist to screen an EMR-generated report of patients with a PAL who were receiving antibiotics. Low-risk patients who provided consent were interviewed by an allergist using telehealth, were assessed utilising a previously developed assessment tool (penicillin allergy history algorithm (PAHA); Table S1), and consented to DOC.[35] In Australia, Li *et al.* deployed a programme where patients with a PAL who required penicillin antibiotic therapy could be referred by AMS and treating clinicians, using predefined low-risk criteria, to an inpatient allergy service for assessment and DOC if appropriate.[15] Trubiano and colleagues demonstrated potentially the highest reward targets for inpatient penicillin allergy programmes (i.e. low-risk phenotypes most likely to convert from assessment to DOC) as patients who were admitted with an infective episode or had a surgical admission.[36] Further, Australian programmes have also demonstrated the sustainability of inpatient DOC programmes, with a focus on targeted delabelling.[42]

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- For hospitals with established AMS services, the incorporation of antibiotic allergy assessment is easiest to

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achieve via opportunistic and targeted delabelling models.

- The incorporation of AMS/allergy rounds in a post-prescription review format is a validated approach, as is utilising AMS clinicians to 'flag' patients to established inpatient allergy services.
- Most published models utilise an EMR custom list of PAL patients receiving antibiotic therapy, screened by an AMS pharmacist.
- While whole-of-hospital approaches are likely reserved for well-resourced programmes, they can aid the attainment of improved hospital assessment to meet the National AMS Clinical Care Standard[13] but are unlikely to translate to DOC for all low-risk patients. Hence, such programmes may be more effective in high-antibiotic usage wards (e.g. surgical, haematological, transplant).
- A focus on written communication to patients is likely to improve delabelling and DOC outcome uptake.

How to undertake and implement patient-level penicillin allergy assessment

There are a variety of validated assessment tools that can be utilised at point of care for the assessment of a PAL. Validated assessment tools are designed to ascertain allergy risk, determine the suitability of penicillin and other beta-lactams, enable consideration of a delabelling strategy and aid clinician prescribing of alternative beta-lactams (see Therapeutic Guidelines for recommendations of alternative antibiotics where beta-lactams cannot be used[43]).

The available assessment tools have recently been reviewed by Wrenn and Trubiano[19] and are demonstrated in Table S1. These tools have been validated in the inpatient, rural/remote, paediatric, critical care and immunocompromised host setting. It is recommended that programmes have a method for patient assessment to aid complete documentation of the four antibiotic allergy criteria in the patient medical record, as required by Australian Clinical Care Standards[13]: (i) active ingredient, (ii) nature of reaction, (iii) date and (iv) severity. The 'severity' remains subjective, and at present there is no nationally endorsed grading for low-, moderate- and high-severity reactions.

Assessment of PAL alone provides an opportunity for intervention – in patients who have undergone assessment and demonstrated tolerance of the implicated penicillin after the index reaction, direct delabelling has been commonly performed.[44] While direct delabelling has also been successfully reported in inpatient PAL delabelling programmes, in those with a reported intolerance of type A ADR (i.e. pharmacologically predictable non-immune mediated side effect),[6,31,33] there is infrequent reporting of this practice and inconsistency with which intolerances can be directly delabelled.[44] Depending on clinician and patient acceptance of direct delabelling for type A ADR to penicillin, DOC, without the requirement for intensive monitoring, may be deployed as an alternative.

The assessment of low-risk PALs can be either via a clinical decision rule or via predefined criteria.[25] Clinical decision rules aim to define low risk typically by a scoring system or algorithm (Table S1). The only Australian-derived and randomised control trial-validated penicillin allergy clinical decision rule is PEN-FAST[28] (Fig. 1). PEN-FAST is a three-point clinical decision rule that has a 96% negative predictive value of asserting a negative DOC[28] and was demonstrated in a recent international randomised control trial (PALACE Study) to be able to direct low-risk patients safely to DOC in lieu of skin testing followed by oral challenge.[45] PEN-FAST has also been adapted for varied populations and settings,[46,47] including immunocompromised hosts and critical care,[42,48] but is not appropriate for use in paediatric patients after failed external validation.[49] A PEN-FAST score of <3 can be used to ascertain a low-risk phenotype, especially for non-allergists. There are a range of criteria-led low-risk definitions, which are primarily expert opinion derived.[25] Local Australian guidelines from the Australasian Society of Clinical Immunology and Allergy have provided a criteria-led framework to describe low-risk phenotypes: benign rash without mucosal involvement or

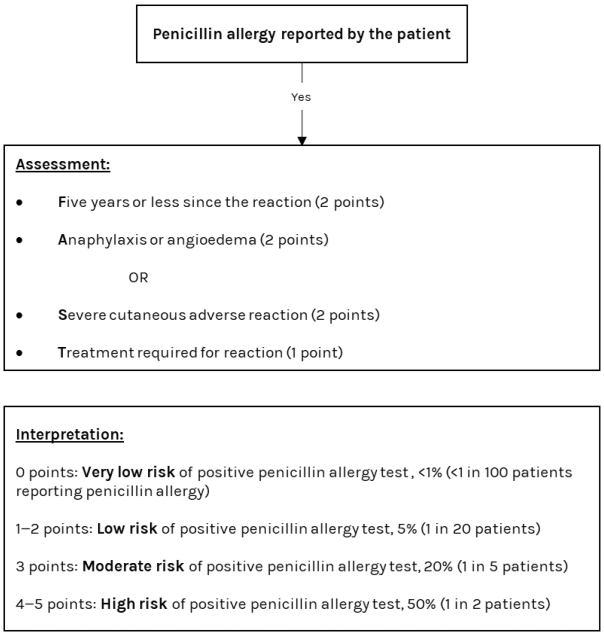

Figure 1 PEN-FAST clinical decision rule.[28]

systemic symptoms >5 years ago.[50] This is supported by the recent US Practice Parameters: benign cutaneous reaction more than 5 years ago.[51] The criteria demonstrated in the literature, while heterogenous in nature, are consistent that a benign or childhood rash >1–5 years ago is considered low risk (Table S1).

Practice guide

We recommend that hospitals develop an assessment strategy that is able to ascertain the four key criteria required for antibiotic allergy documentation as defined by the AMS Clinical Care Standard – that is:

- Active ingredient (implicated drug), as specific as possible
- Nature of the reaction
- Date of the reaction, or as specific as possible
  - For example, <1 year ago, <5 years ago, >5 years ago
- Severity of the reaction

Following local review, an assessment tool should be chosen with consideration of adaptation for the care setting. A PEN-FAST score of <3 (clinical decision rule) or criteria of childhood exanthema or benign rash >1–5 years ago (criteria-led) are low-risk phenotypes that are prime targets for DOC.

Approaches to inpatient DOC in low-risk patients

There is increasing evidence for the safety and efficacy of DOC (single or multistep) with the implicated penicillin or amoxicillin in the setting of low-risk PAL to effect inpatient delabelling[5,7] (Table S2). Mitri *et al.* performed a recent scoping review of direct oral penicillin challenge in the community, outpatient and inpatient settings, identifying 6394 DOC, noting heterogeneity of low-risk criteria to direct challenge. Nonetheless, universally anaphylaxis and severe cutaneous adverse reactions (SCAR) (high-risk features) were excluded.[25] The negative challenge rate in a recent review of inpatient DOC was 91%–100% in the reported literature and in the Australian setting a rate of 96.4%–98.5% with no serious adverse events (SAEs).[25]

There is considerable heterogeneity in the practice of DOC, regarding dose (250–1000 mg), steps (one step, two steps, more than two steps), agent (phenoxymethylpenicillin, amoxicillin), observation period (30 min to 2 h) and stakeholder delivery. From a recent review 71% of DOC publications utilised amoxicillin as the agent, and 29% used the implicated penicillin.

On review of the literature at present, there is no clear difference in safety outcomes between single- versus multistep DOC and choice of agent, with 57% of the literature deploying single-dose DOC, 28% utilising a multistep design and the remainder ill defined.[25] The largest study of inpatient DOC ($n = 478$) utilised a single-dose approach without SAE.[42] The route of challenge in the literature has primarily been oral; however, nasogastric has been used in a critical care setting and clinical practice.[48] The consideration of prolonged oral challenges (i.e. >1 dose) remains controversial, with a recent meta-analysis providing no clear benefit, although there remains an absence of controlled studies.[52]

The observation period for DOC protocols varies from 30 min to 2 h,[25] with 66% of studies observing patients for 60 min after DOC, without a clear definition of what constitutes 'observation'. In a review of the inpatient DOC data by Rose *et al.*, there was no stipulation of time to positive challenge.[7] There was no report of SAE in the Australian experience.[7] In most clinical experiences nursing staff have provided the direct observation with medical teams' involvement primarily in the setting of DOC consent and finalisation of challenge result.[6,15,25] There is limited documentation in protocols for the requirement of cannulation or pre-emptive prescribing of medications such as adrenaline or anti-histamines.

With regard to the stakeholder involved in the delivery of inpatient DOC, there are varied approaches as outlined below:

- *Primary assessment*: There remains heterogeneity in the discipline performing the primary assessment. Sixty per cent of DOC publications report a multidisciplinary team in the delivery of the programmes.
- *Prescribing*: 70% of studies utilised an allergist or non-allergist specialist (e.g. infectious diseases physician) for the prescription of the DOC.[25] While there is emerging evidence for pharmacist-led prescribing, physician-led DOC is presently supported by the literature.
- *Follow-up procedures after DOC*: There remains an absence of literature describing study follow-up procedures after DOC, with only 49% reporting an element of 'follow-up' which is heterogenous in nature.[25] In practice, therapeutic doses of a penicillin can follow immediately after a DOC has been completed.

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The following are suggested approaches to performing a penicillin DOC:

- *Consent*: Obtain informed written consent prior to DOC. If written consent is not possible, document clear verbal consent in the patient medical record.
- *Drug administration*: Single-dose challenge with 250–500 mg oral or nasogastric amoxicillin.
  - Where the implicated penicillin is known, this may be used.
  - A single-dose oral challenge, without extended challenge, is the preferred method. A multistep challenge may be performed where this would aid consumer or stakeholder acceptance of the process.
  - Noting the dose is a 'challenge' in the prescription is suggested to provide clarity to nursing, pharmacy and medical teams.
  - Precharting of emergency medications or cannulation prior to DOC is not required.
- DOC should be performed within hospital 'business hours', unless being undertaken in higher acuity settings.
- *Observations*: We recommend performing a baseline set of observations in the inpatient setting to exclude concurrent medical instability prior to commencing DOC. We recommend a minimum observation period of 60 min, with consideration of visual or objective observations being performed at 30-min intervals. Primary nursing-led observations, with medical staff available to review in the event of an adverse event and to finalise the result of the challenge, is preferred.
- *Follow-up*: Patient telephone or in-person follow-up after DOC is preferred. If not feasible, it is recommended to provide care team contact details for patients to use in the event of a reported adverse event after DOC.
- *Consumer communication*: The outcome of the DOC should be communicated to the patient with a clear verbal explanation accompanied by a simple patient information letter. Correspondence with the GP and other relevant specialists should be completed.
- *EMR documentation*: The outcomes of penicillin oral challenge should be updated in the hospital record and uploaded to the patient's My Health Record, including delabelling of the penicillin allergy in the event of a negative challenge. See Appendix S1 *NAAN Inpatient DOC Checklist* for further details.
- Therapeutic penicillins can be utilised immediately after a negative DOC.

How to undertake inpatient skin testing in moderate- to high-risk patients

The body of evidence for skin prick (SPT) and intradermal testing (IDT) lies in the outpatient setting; however, over the last decade increasing reports of inpatient AMS or infectious diseases-led skin testing have been demonstrated, in particular in the United States.[19,53,54] A standard panel of skin testing reagents must be appropriate for the Australian setting and within Therapeutic Goods Administration approval. Therefore, the Diater benzylpenicilloyl-polylysine (PPL) and minor determinant mixture (MDM), which were primarily validated in Europe, are recommended,[55] in combination with benzylpenicillin 10 000 units and ampicillin (or amoxicillin) at 20–25 mg/mL for SPT and IDT.[56] The cost of the Diater preparation has been prohibitive in the Australian context, and the role of MDM remains controversial.[57] This should only be performed with a skilled workforce with experience in the delivery and interpretation of SPT and, in particular, IDT. Skin testing alone does not remove a PAL and, in the setting of a negative IDT, must be followed by oral or intravenous provocation as per site local protocol. The acute need for SPT/IDT in high-risk testing is also further mitigated in the 21st century by (i) desensitisation[58] and (ii) application of cross-reactivity principles,[59,60] which enable the use of any non-cross-reactive cephalosporin in a reported PAL (excluding in SCAR phenotypes).[51]

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Considering the cost of reagents, human resources and training required to deliver inpatient skin testing, this practice should be avoided as a primary objective, and the focus should remain on DOC for low-risk phenotypes and the application of cross-reactivity principles to enable cephalosporin utilisation in patients with a PAL.

What is a positive challenge?

Patient-reported symptoms following a drug allergy challenge are frequently reported; however, few are immune-mediated reactions that should result in the persistence of the PAL. While grading systems for ascertaining positive challenges have been identified primarily for food reactions, drug allergy is less well defined. Khan *et al.* recently proposed a grading system for immediate reactions (<6 h after dose) of no reaction and grade 0–4.[61] Grades 1–4 are considered a positive challenge, with grades 3 and 4 defined as severe and life-threatening respectively. In particular, isolated gastrointestinal reactions, tingling, subjective lip swelling, dyspnoea, palpitations, light-headedness, hypertension, cough, chest tightness, throat sensation without objective findings, subjective itch without rash and headache are labelled a grade 0 reaction and not considered an allergy. This grading system does not cover delayed

hypersensitivities, and of note some delayed hypersensitivities may occur within 6 h of dose, especially on rechallenge.[62]

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Patients reporting subjective signs or symptoms should be encouraged that these responses are not a true allergy and do not preclude the future use of the medication. This may require an open discussion, reinforcement and encouragement by the medical team. A grading system can be utilised by clinicians to help provide clarity of true positive challenges.

Summary of practice guide statements

This paper provides a practice guide to the delivery and implementation of penicillin allergy programmes in the inpatient setting, with a focus on AMS practices and addressing the Australian healthcare context. A summary of an approach to inpatient PAL assessment and delabelling is provided in Figure 2. A practical procedural guide for inpatient DOC is provided in Appendix S1. Specific key practice guide statements are provided as follows:

- Addressing local barriers and enablers to PAL assessment and delabelling at the health service is central to the delivery of a penicillin allergy programme.
- A variety of assessment tools and clinical decision rules are available for use and should be piloted and adapted to your workflow to increase healthcare worker engagement and participation.
- DOC can be performed safely on an inpatient ward with a preference for patients with (i) acute antibiotic need, (ii) clinical stability and (iii) low-risk phenotypes.
- The definition of low-risk phenotypes amenable to inpatient DOC are either clinical decision rule-led (PEN-FAST <3) or criterion-led (childhood rash or benign cutaneous exanthema >1–5 years ago).
- DOC can be performed in acute or subacute care with preference given to (i) single-dose challenge, (ii) amoxicillin 250–500 mg, (iii) 60 min minimum observation period and (iv) no pre-prescription of emergency medications.
- Informed written consent is recommended prior to DOC. Where this is not possible, clear documentation of verbal consent should be in the patient medical record.
- Written communication following a successful or unsuccessful challenge should be provided to patients

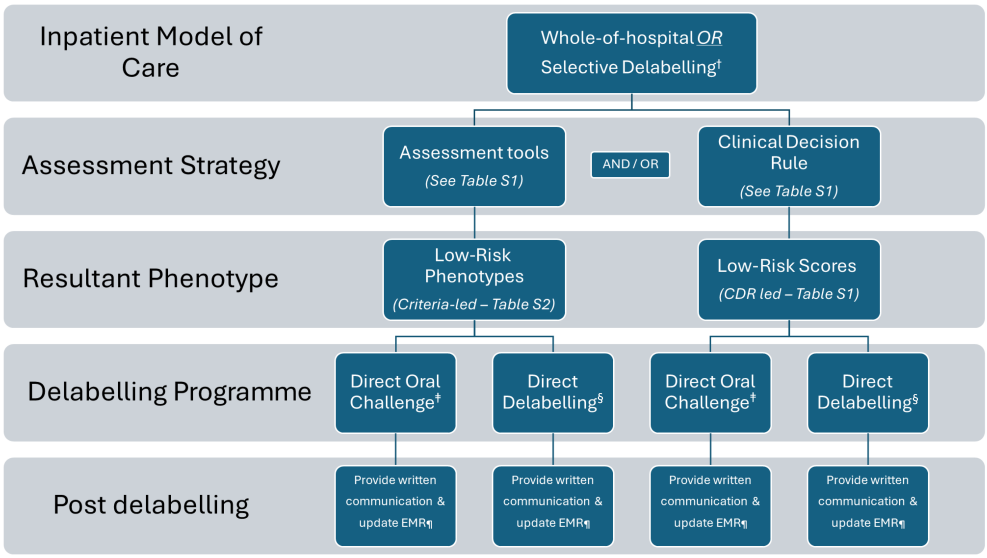

Figure 2 Suggested approach to penicillin allergy in inpatient setting. †Selective delabelling – the implementation of delabelling strategies in the inpatient setting that are targeted (i.e. penicillin allergy assessment and/or direct oral challenge (DOC) when acute antibiotic need) or opportunistic (i.e. penicillin allergy assessment and/or DOC when there is no acute antibiotic need but in host likely to require future penicillin utilisation). ‡Direct oral challenge – amoxicillin; 250–500 mg single-dose challenge; routine inpatient wards; observation period minimum 60 min. §Direct delabelling – removal of allergy label following assessment and/or medical reconciliation. ¶Following DOC, irrespective of positive or negative challenge provide written communication to patient and clinicians (inpatient and community), Examples of consumer information and post-DOC documentation can be found in Appendix S1.

and clinicians to help aid delabelling documentation and sustainability. Clinicians should also provide a clear verbal explanation of the outcome and meaning of the DOC results, with opportunity for questions.

- Positive challenges can be defined by a recently published grading system to help avoid over-labelling of patients reporting subjective symptoms following a DOC.
- The model of penicillin allergy programme must be adapted to the requirements and resources available at the health service. Evidence is supportive of a multidisciplinary model which is AMS-led in the inpatient space utilising custom or EMR-generated lists of patient capture.

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Supporting Information

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Appendix S1 Supporting Information.