GUIDELINE	
Beta-lactam Allergy Guideline	
Scope (Staff):	Medical, Nursing, Pharmacy
Scope (Area):	Perth Children's Hospital (PCH)

This document should be read in conjunction with this DISCLAIMER

Aim

To help guide antibiotic selection in children with allergies, a risk stratification approach has been adopted based on the current available evidence.

Background

Beta-lactams are the most commonly used antibiotics and include penicillins (e.g. amoxicillin, piperacillin, benzylpenicillin), cephalosporins (e.g. cefalexin, ceftriaxone) and carbapenems (e.g. meropenem). Similarly Beta-lactam allergies are the most frequently reported antibiotic reactions in children.

Recent data support that the majority of patients who are 'labelled' with a Beta-lactam allergy can in fact tolerate the antibiotic in question without the need for skin testing.[1,2] Moreover, the use of alternative antibiotics for patients labelled with allergy leads to poorer clinical outcomes, prolonged hospitalisation, increased costs and increased adverse effects. [3-6]

The risk stratification system used in this guideline is a safe but simplified approach to a very complex issue. An individualised approach may be required in certain settings.

Risk Classification

Beta-lactam allergies can be classified into high risk and low risk based on the likelihood of subsequent reaction upon exposure.[7,8]

- **No risk:** no previous reaction; non-immune mediated intolerances (e.g. nausea, diarrhoea); family history of Beta-lactam allergy.
- **Low risk:** a delayed rash (>1hr after initial exposure) without mucosal or systemic involvement (without respiratory distress and/or cardiovascular compromise).
- **High risk:** an immediate rash (<1hr after exposure); anaphylaxis; severe cutaneous adverse reaction {e.g. Drug Rash with Eosinophilia and Systemic Symptoms (DRESS) and Stevens – Johnson syndrome (SJS) / Toxic Epidermal Necrolysis (TEN)} or other severe systemic reaction.

Management

The Children's Antimicrobial Management Programme (ChAMP) guidelines stratify recommendations based on Beta-lactam allergy and risk classification.

Low risk: alternate antibiotic as per ChAMP* AND

- **>1yr since reaction:** consider oral challenge for PCH inpatients if stable[#]
- **<1yr since reaction:** immunology outpatient referral to explore allergy / de-labelling

- **High risk:** immunology referral, alternate antibiotic as per ChAMP**

**Refer to individual guidelines for specific antibiotic recommendations*

[#]Immunology inpatient consult required for all oral challenges

The majority of true Beta-lactam allergies are mediated by reactivity to the side chains present on the beta-lactam ring. Antibiotics with similar side chains in both the penicillin and cephalosporin classes carry a higher risk of cross reaction (Figure 1). There is a very low risk of cross reaction (<2%) if a beta-lactam with a different side chain is administered.

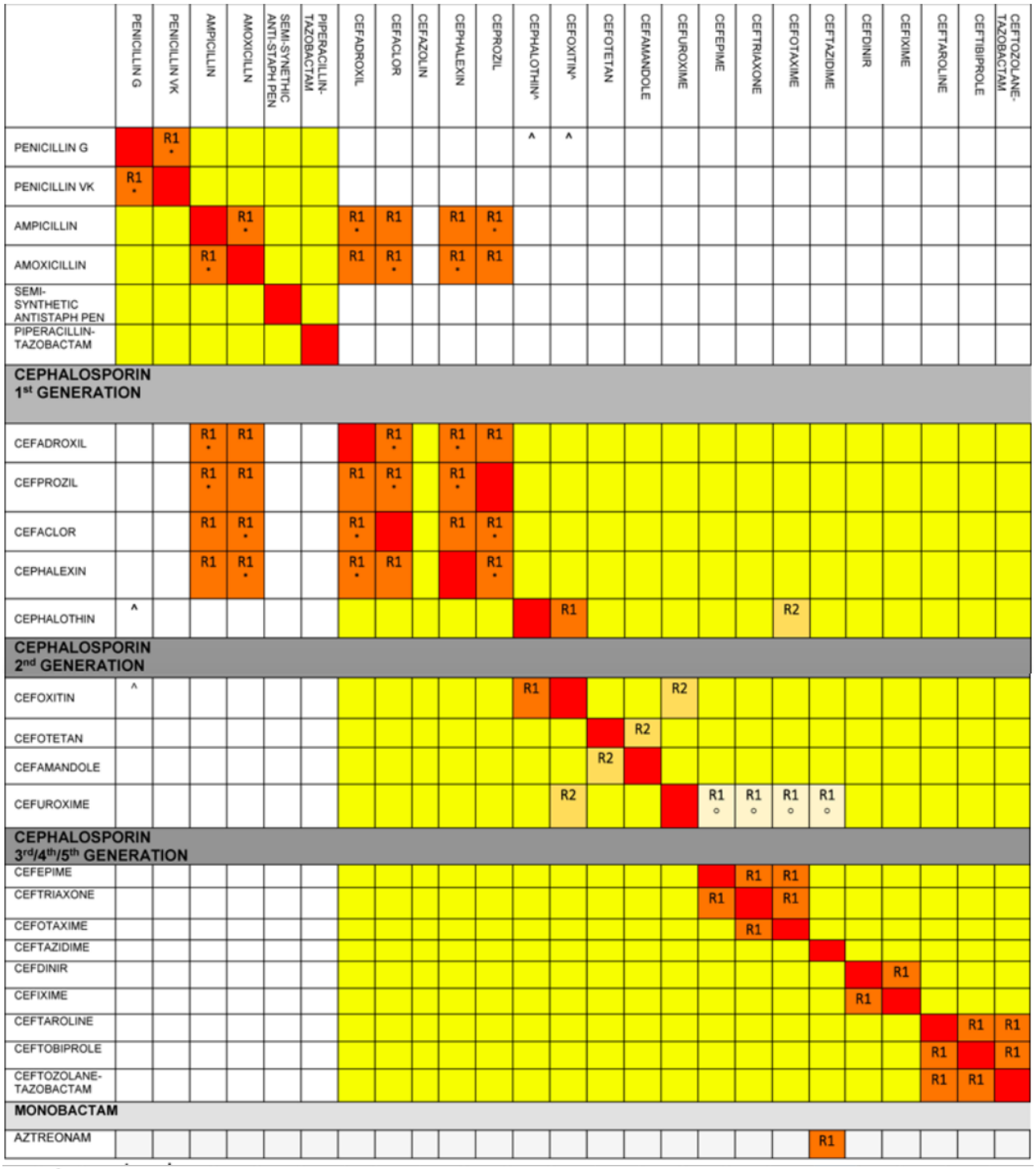
**For high risk patients a non-Beta-lactam antibiotic is recommended. Refer to individual guidelines for specific antibiotic recommendations. In selected patients with a history of high-risk allergy, a Beta-lactam from another subclass (e.g. a cephalosporin or carbapenem) may be considered in discussion with immunology.

Oral Challenge

At present inpatient oral challenges are reserved for low-risk patients admitted to PCH in discussion with immunology – for other patients labelled with Beta-lactam allergy complete an outpatient referral to PCH immunology.

Please refer to: Antibiotic Challenge (Immunology) Protocol

Figure 1: Antibiotics grouped by similar side chain[9].



Legend

^ *In vitro* data proposed cross-reactivity between cefoxitin and cephalothin based upon shared but not shared R1

Exactly the same drug

R1 – Identical R1 side chain

R1* – Almost Identical R1 side chain

R2 - Identical R2 and non-identical R1 with some cross-reactivity

R1° Non-identical R1 with some clinical cross-reactivity

Shared class specific ring but no shared side chain structure

No shared class specific ring, only shared beta-lactam ring

No shared cross reactivity with beta-lactam ring

Related internal policies, procedures and guidelines
Allergic Reactions and Anaphylaxis – Management for Planned Allergy Challenges (Immunology)
Antibiotic Challenge

References

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