

# Louth: Antimicrobial Guidelines - Louth Hospitals: Antimicrobial Guidelines: Paediatrics - Evaluating for antibiotic allergy before prescribing antimicrobials

## Background:

Before prescribing any antimicrobial agent, a history of possible contraindications, adverse reactions, allergies, must be sought. Rashes, including urticarial rashes are common occurrences in childhood febrile illnesses. Over 90% of reported paediatric "allergic" reactions to antimicrobials cannot be repeated or were merely well described side effects such as penicillin induced diarrhoea or macrolide induced nausea. Unnecessary use of alternative antibiotics increases the risk of development of antimicrobial resistance. Incorrect labelling of antibiotic allergy can lead to unnecessary use of more toxic alternative antimicrobials and increase hospital stay.

## Types of allergic reactions:

### Immediate hypersensitivity reactions (Type 1)

Type 1 reactions are IgE-mediated and occur <1 hour post dose. Clinical signs include urticarial or pruritic rash, angioedema, rhinitis, respiratory and or cardiovascular compromise.

### Delayed Hypersensitivity reactions (Types II, III, IV)

**Type II reactions** are IgG mediated and occur > 72 hours post dose. These are not true 'allergic reactions' however these reactions should lead to avoidance of future use of the suspected drug. Common manifestations of this type of reaction include haemolytic anaemia, neutropenia or thrombocytopenia.

**Type III reactions** are generally associated with immune complex deposition and complement activation (e.g. serum sickness like reaction to cefaclor, glomerulonephritis).

**Type IV reactions** are the most common drug hypersensitivity reactions encountered. These are not antibody mediated but relate to T cell activity. The skin is most often involved in generalised maculopapular eruptions (e.g. beta- lactam related rashes typically developing after a number of days on treatment).

## Taking a drug allergy history:

The parent should be asked to describe the previous reaction, including timing of the reaction, the type of rash, distribution and how long it took to resolve. Photos if available should be reviewed. Maculopapular rashes that develop in young children on day 3 or 4 post commencing a course of oral antibiotic and resolve quickly are very unlikely to indicate future risk of severe allergic reaction.

## Red flags: (Symptoms more likely to indicate risk of future reactions)

- History of angioedema
- History of breathing difficulties
- History suggestive of cardiovascular compromise

The symptoms listed above are strongly suggestive of a previous Type 1 reaction and thus future prescribing would be contraindicated.

- Joint swelling

A history of joint swelling may indicate serum sickness like reaction. Further administration can trigger a Type 1 reaction. In the first instance avoidance is advised.

- History of hospitalisation due to previous drug eruption.
- History of skin peeling or desquamation
- History of bruising (vasculitis)
- History of involvement of mucous membranes
- History of internal organ involvement, abnormal blood parameters

The symptoms listed suggest a previous severe cutaneous adverse reaction (SCAR). In this case re-prescribing of the suspected agent is contraindicated as SCARs carry a mortality rate of 10%.

## Management Options:


**Note: Discussion with the ID/Microbiology may be necessary, in order to choose the most appropriate alternative antimicrobial.**

**Recording adverse drug reactions:**

If the clinician determines from the history that use of a particular antimicrobial is contraindicated, this should be documented:

- On the most recent drug chart, dated and signed
- A more detailed note should be recorded in the medical notes documenting all aspects of the history that lead to the decision to avoid the antibiotic
- A follow up plan should be made and documented in the medical notes: see above re management options.

Essential data to record in the medical notes:

- The date of the reaction
- The time of onset with relation to the most recent course of antibiotics
- If multiple antibiotics have been prescribed, document the date of onset of each one
- Record all symptoms and clinical signs including those that may not be (at first glance) involved
  - **Rash:** Include its distribution, characteristics, mucous membrane involvement/not, obvious areas that are spared
  - Presence or absence of lymphadenopathy (check all sites)
  - Evidence of internal organ involvement
  - Presence or absence of fever
  - Also record any abnormal laboratory indices: LFTs, eosinophilia, cytopenia etc.

**Choosing alternative antibiotics:**

- Patients with a history of Type 1 reactions to penicillin or amoxicillin are likely to tolerate monobactams and carbapenems.
- Patients with a history of Type 1 reactions to amoxicillin are likely to react to cephalosporins with a similar side chain on the  $\beta$ -lactam ring i.e. 1st and 2nd generation cephalosporins. These should be avoided. Other cephalosporins (3rd, 4th and 5th generation) with different side chains are more likely to be tolerated in penicillin allergic individuals. If the initial reaction was severe (anaphylaxis) discuss with allergy team before administration.
- Patients with a history of delayed reactions such as morbilliform or maculopapular rash may also tolerate 1st and 2nd generation cephalosporins.
- Patients with a history of SCARs (SJS, TENS, DRESS) or haemolytic anaemia should not be commenced on a beta-lactam without discussion with allergy/ID/Micro teams.