

**Penicillin Allergy and Use of
Other Antibiotics**

	7300-646PT
Policy No.:	7310-646PT
	8790-646PT
Original Policy Date:	10/10/2016
Revision Date(s):	
Review Date(s):	
Approval:	
	11/17/16 Pharmacy & Therapeutics Committee
	12/16/16 Unified Medical Executive Committee

POLICY STATEMENT:

Penicillin allergy is reported to occur in up to 10 percent of the population. Of those reported to be allergic, only 10 to 15 percent actually are. When penicillin allergy is present, the use of other antibiotics that share common structure, such as members of the cephalosporin, carbapenem or monobactam class of antibiotics is questioned. Unnecessary withholding of penicillins or the associated antibiotic classes in patients assumed to be allergic may lead to morbidity, mortality and increased cost. The process outlined below may be utilized for patients with reported penicillin allergy who require treatment with an associated antibiotic, as described above.

SCOPE: All patients reported to be allergic to penicillin or derivative of penicillin (aminopenicillins).

DEFINITIONS:

Immediate Reactions – Usually begin within an hour of administration of the dose of the medication, but can occur within minutes. Following oral administration or administration with food the reaction can occur within 6 hours. Rapid escalation may occur with successive doses. Anaphylaxis is the most severe form of immediate reactions. Reactions are IgE mediated.

Delayed Reactions – Appears after multiple doses (after 6 hours but usually days to weeks). Reactions may also occur after completion of drug treatment. Reactions are not IgE mediated.

Penicillin Desensitization – Procedure that *temporarily* alters the immune response to the medication, resulting in short term tolerance.

Graded Challenge - Starting dose 1/100 to 1/10th of full dose. A tenfold increase in dose is administered every 30 to 60 minutes until full dose is realized.

ACTION STEPS:

When a patient is reported to be allergic to penicillin, attempt will be made to determine the type of reaction and its severity.

Cephalosporin Use in Patients with Reported Penicillin Allergy

1. If skin testing is not available, an estimate of the chances of a serious IgE mediated immediate type reaction to a cephalosporin must be weighed.
2. The number of positive reactions to cephalosporin administration in patients with a positive skin test for penicillin is estimated to be 2%.
3. As penicillin -specific IgE antibodies decrease over time, patients with more distant reactions are less likely to react to cephalosporins. If more than 10 years have elapsed since the reaction to penicillin has occurred, and the reaction was not consistent with an IgE mediated reaction, the cephalosporin may be administered if the cephalosporin does not have an identical side chain to the penicillin.

Immediate Type IgE Mediated Reactions
Urticarial Rash (wheal and flare)
Pruritis
Flushing
Angioedema of the face, extremities or laryngeal tissues leading to throat tightness, change in voice quality
Bronchospasm (wheezing, chest tightness, difficulty breathing)
Gastrointestinal symptoms (cramping, nausea, vomiting, diarrhea)
Hypotension

4. If the reaction occurred within the past 10 years and/or the symptoms are consistent with an IgE mediated reaction,, patients may be given a cephalosporin with a dissimilar side chain, with graded challenge consideration.
5. In addition to the beta-lactam ring structure common to all penicillins, cross reactivity to patients allergic to a penicillin may occur when the cephalosporin contains an identical side chain. Side chains for aminopenicillins and related cephalosporins are listed below.

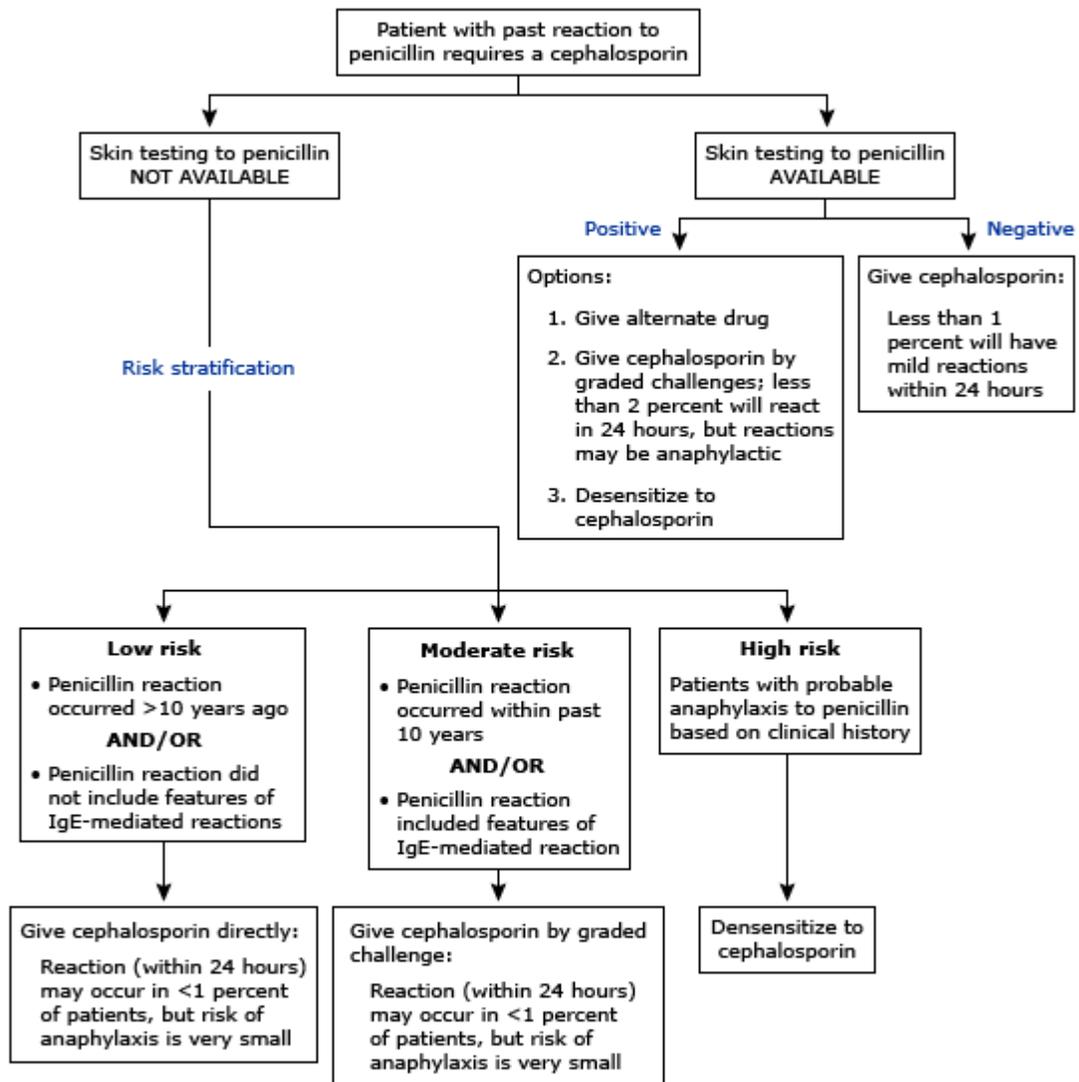
Amoxicillin has identical side chain to:	Ampicillin has identical side chain to:
Cefadroxil	Cefaclor

Cefprozil	Cephalexin
Cefatrizine	Cephradine
	Loracarbef
	Cephaloglycin

When orders for cephalosporins are obtained for patients with identical side chains to the corresponding aminopenicillin listed above, the physician will be notified regarding selection of an alternate product, including a cephalosporin with a different side chain.

The following flow diagram may also be consulted:

Administration of a cephalosporin to a patient with a history of penicillin allergy



IgE: immunoglobulin E.

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- If a cephalosporin is ordered in a penicillin allergic patient and the two antibiotics have dissimilar side chains, the cephalosporin may be administered as the chance of reacting is very small.

Carbapenem Use in Patients with a Reported Penicillin Allergy

1. Carbapenems (ertapenem, meropenem, doripenem, imipenem) share a common beta lactam ring with penicillins and the chance for cross reactivity.
2. Less than 1% of penicillin-allergic patients show reactivity to the carbapenems.
3. A similar approach as outlined for cephalosporins above may be used for patients with a history of penicillin allergy.

Monobactam Use in Patients with a Reported Penicillin Allergy

1. Aztreonam is the only available monobactam currently approved for use.
2. Studies have demonstrated no immunologic cross sensitivity between penicillin and aztreonam.
3. Patients with a penicillin allergy may safely be administered aztreonam.

Penicillin Desensitization

1. Penicillin desensitization should be considered for all patients who have shown a positive past immediate IgE mediated type reaction who require treatment with a penicillin because no other effective antibiotic is available.
2. Desensitization should not be attempted in patients: with histories of blistering reactions such as Stevens Johnson Syndrome or toxic epidermal necolysis as even small amounts of drug can result in severe reactions. Desensitization may not be appropriate in patients with a history of hemolytic anemia or interstitial nephritis because these reactions are dependent on IgG antibodies.
3. Desensitization should only be performed by an ID or Allergy Specialist.

Reference

1. UpToDate 2016