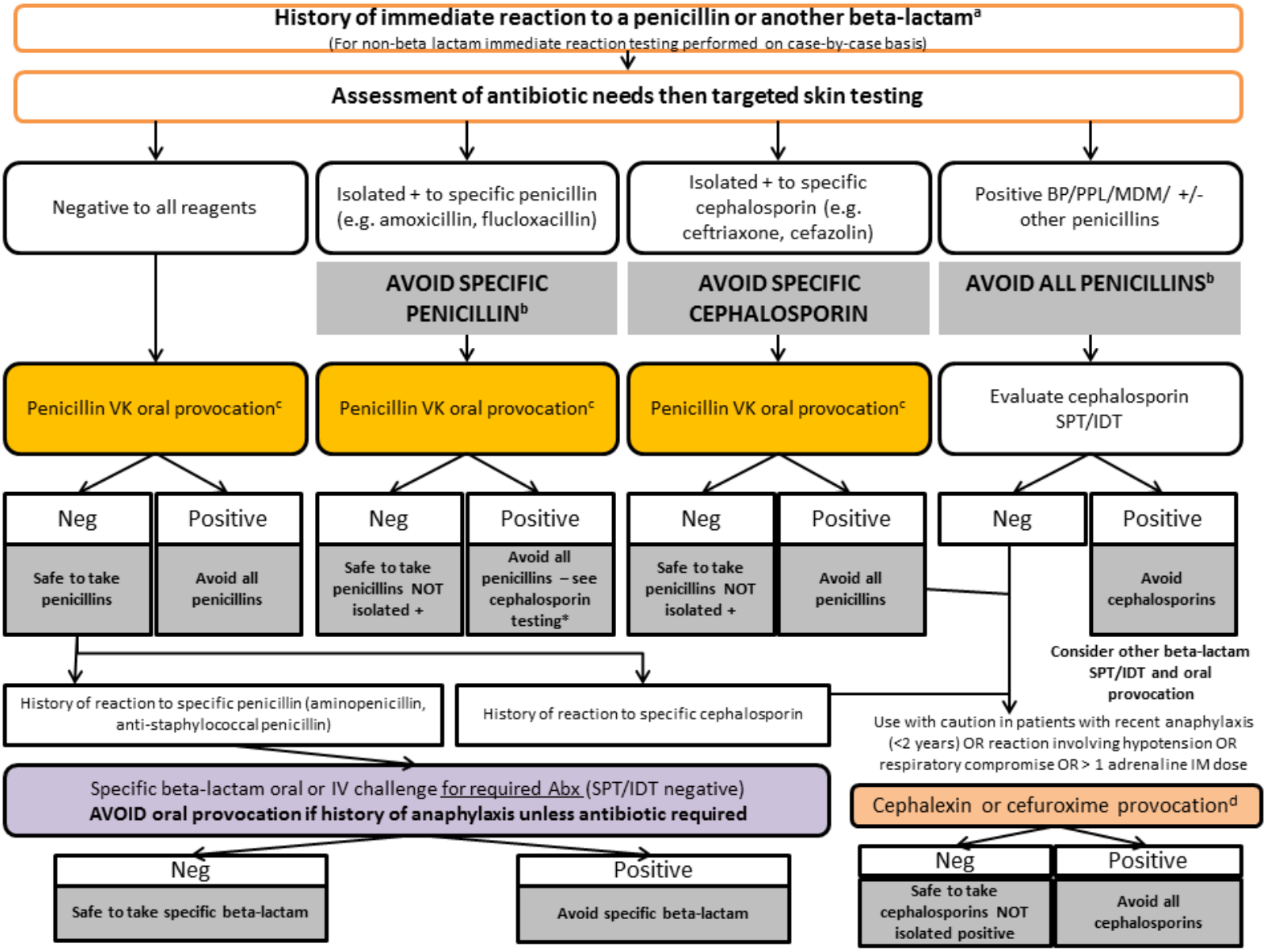
Centre for Antibiotic Allergy and Research
Optimising antibiotic therapy

Centre for Antibiotic Allergy and Research Beta-lactam Testing Algorithm

a: *Antibiotic allergy testing for patients with a history of immediate or unknown hypersensitivity*



Adapted from references listed (with permission)[1-4].

Abbreviations: SPT, skin prick testing; IDT, intradermal testing; BP, penicillin G; PPL, Diater major determinant; MDM, minor determinant mixture

[a] If history "unknown" then patient should receive testing as per immediate hypersensitivity protocol, with the addition of a prolonged oral antibiotic challenge (5-day).

[b] Penicillin – penicillin V/G, amoxicillin, flucloxacillin, oxacillin, dicloxacillin, piperacillin-tazobactam

[c] If amoxicillin required acutely, 2-step should be performed (50mg then 200mg after 20mins).

[d] If patient has a history of recurrent pulmonary infections then cefuroxime would be preferred oral provocation. If recurrent urinary tract infections then cephalexin challenge (if negative aminopenicillin SPT/IDT). If positive IDT to ceftriaxone or cefepime avoid cefuroxime challenge.

Note[1]: For oral provocation outside penicillin VK, consider 2-step oral provocation if challenging a patient with a history of anaphylaxis.

Note[2]: For patients with a unspecified penicillin allergy that occurred prior to the advent of amoxicillin release in Australia (1972), penicillin V challenge only performed. If penicillin allergy unspecified occurred post amoxicillin release, patient will undergo sequential penicillin V then amoxicillin challenge.

Note[3]: For patients with a history of mild immediate hypersensitivity to sulfonamide antibiotics a single dose challenge with Bactrim LIQUID (200mg/40mg in 5 ml) is provided (1ml [40/8 – SMX-TMP] then 9ml [360/72])

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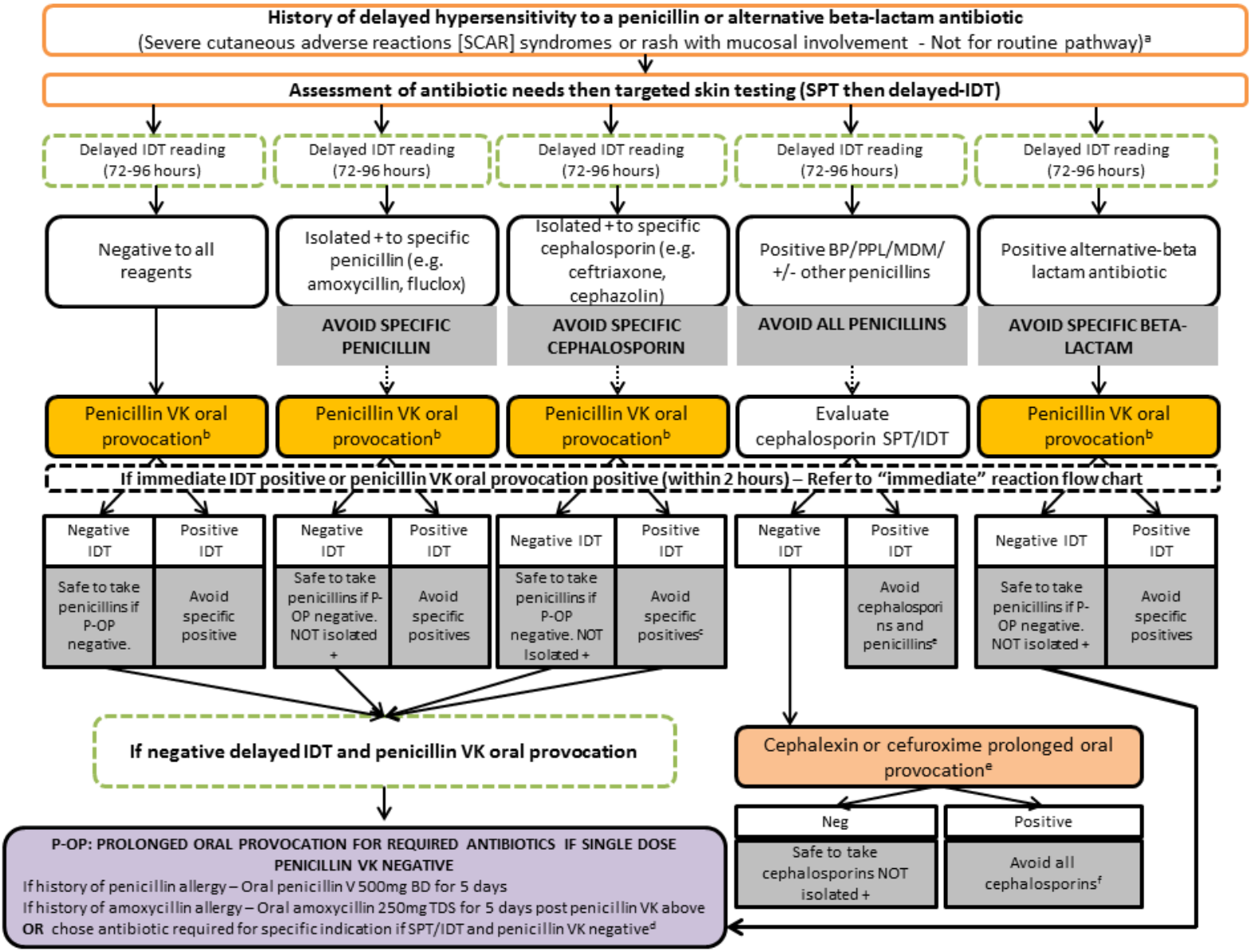
b: *Antibiotic allergy testing for patients with a history of delayed hypersensitivity*



Adapted from references listed (with permission)[1-4].

Abbreviations: OP, oral challenge/provocation; P-OP, prolonged oral provocation; IDT, intradermal testing; SPT, skin prick testing; SCAR, severe cutaneous adverse drug reactions; BP, penicillin G; PPL, Diater major determinant; MDM, minor determinant mixture.

Note[1]: If a patient has a history of a beta-lactam allergy and is known to tolerate alternative beta-lactams, prolonged oral provocations (5 days) can be performed following negative SPT/IDT outside of demonstrated schematic, tailored to known infection history and current/future antibiotic requirements.

Note[2]: In patients with > 1 positive delayed IDT to a penicillin and cephalosporin that don't share identical/similar R1 side chain then recommended to avoid penicillins and cephalosporins.

Note[3]: In patients with positive delayed IDTs (>1) to beta-lactams that share the same R1 side chain (e.g. cefuroxime/ceftriaxone, cefepime/ceftriaxone, aztreonam/ceftazidime, cephalothin/penicillin G), oral challenges can be undertaken to beta-lactams that are dissimilar in R1 structure.

[a] If history of drug reaction with eosinophilia and systemic symptoms (DRESS), fixed drug eruption (FDE) or acute generalised exanthematous pustulosis (AGEP) then delayed intradermal and oral provocations as required. If Steven Johnson syndrome (SJS) or toxic epidermal necrolysis (TEN) patch testing of implicated antimicrobials applied. Antibiotic provocations following testing in SCAR tailored to specific patient antibiotic requirements.

[b] If history of mild-moderate delayed hypersensitivity (not SCAR), single dose oral provocation may be performed directly post negative SPT/IDT, followed by 5-day provocation. If severe hypersensitivity or SCAR then only perform oral provocations post delayed IDT readings.

[c] If patient tolerates penicillins and aminopenicillins and isolated positive to a cephalosporin can consider further oral cephalosporin provocations with antibiotics that differ in R1/R2 side chains.

[d] Antibiotic oral duration for 5 days at lowest therapeutic dose. No intravenous or intramuscular challenges. In patients with a history of non-SCAR allergy to sulphonamide and trimethoprim-sulfamethoxazole (TMPS-SMX) required, one single strength TMP-SMX challenge recommended, without prior skin testing. In patients with other non-beta lactam delayed allergy phenotypes a combination of delayed IDT, patch testing and oral provocations individualised for patient antibiotic requirements. For patients with positive isolated cephalosporin IDT or oral provocation, subsequent IDT/OC can be performed to cephalosporins with different R1/R2 side chains.

[e] Provide recommendations for antibiotic usage outside of penicillins and cephalosporins.

[f] Cephalexin 250mg BD for 5 days or cefuroxime 250mg BD for 5 days. If patient was positive to aminopenicillin on IDT or oral challenge then avoid challenge with aminocephalosporin (e.g. cephalexin, cefaclor).

References

1. Bourke J, Pavlos R, James I, Phillips E. Improving the Effectiveness of Penicillin Allergy De-labeling. The journal of allergy and clinical immunology In practice 2015; 3(3): 365-34 e1.
2. Trubiano J, Phillips E. Antimicrobial stewardship's new weapon? A review of antibiotic allergy and pathways to 'de-labeling'. Current opinion in infectious diseases 2013; 26(6): 526-37.
3. Trubiano JA, Thursky KA, Stewardson AJ, et al. Impact of an Integrated Antibiotic Allergy Testing Program on Antimicrobial Stewardship: A Multicenter Evaluation. Clinical infectious diseases : an official publication of the Infectious Diseases Society of America 2017; 65(1): 166-74.
4. Urbancic KF, Ierino F, Phillips E, Mount PF, Mahony A, Trubiano JA. Taking the challenge: A protocolized approach to optimize Pneumocystis pneumonia prophylaxis in renal transplant recipients. American journal of transplantation : official journal of the American Society of Transplantation and the American Society of Transplant Surgeons 2017.