

The Non-irritating Skin Test Concentrations for Commonly Used Beta-lactam Containing Antibiotics other than Penicillin

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Background & Objective

- Penicillin allergy is the most commonly reported drug allergy in the US (10% of the population) but after an allergy evaluation including skin testing (ST), less than 1% are truly allergic to penicillin.¹
- Skin tests are validated for penicillin but not for other antibiotics containing beta-lactam (e.g. amino-penicillin and cephalosporins).²
- Previously reported non-irritating concentrations (NIC) were obtained from small cohorts and in healthy volunteers.³
- To elucidate the NIC of commonly used beta-lactam containing antibiotics other than penicillin including cephalosporins utilized during an allergy evaluation.

Figure I

Indication for beta-lactam

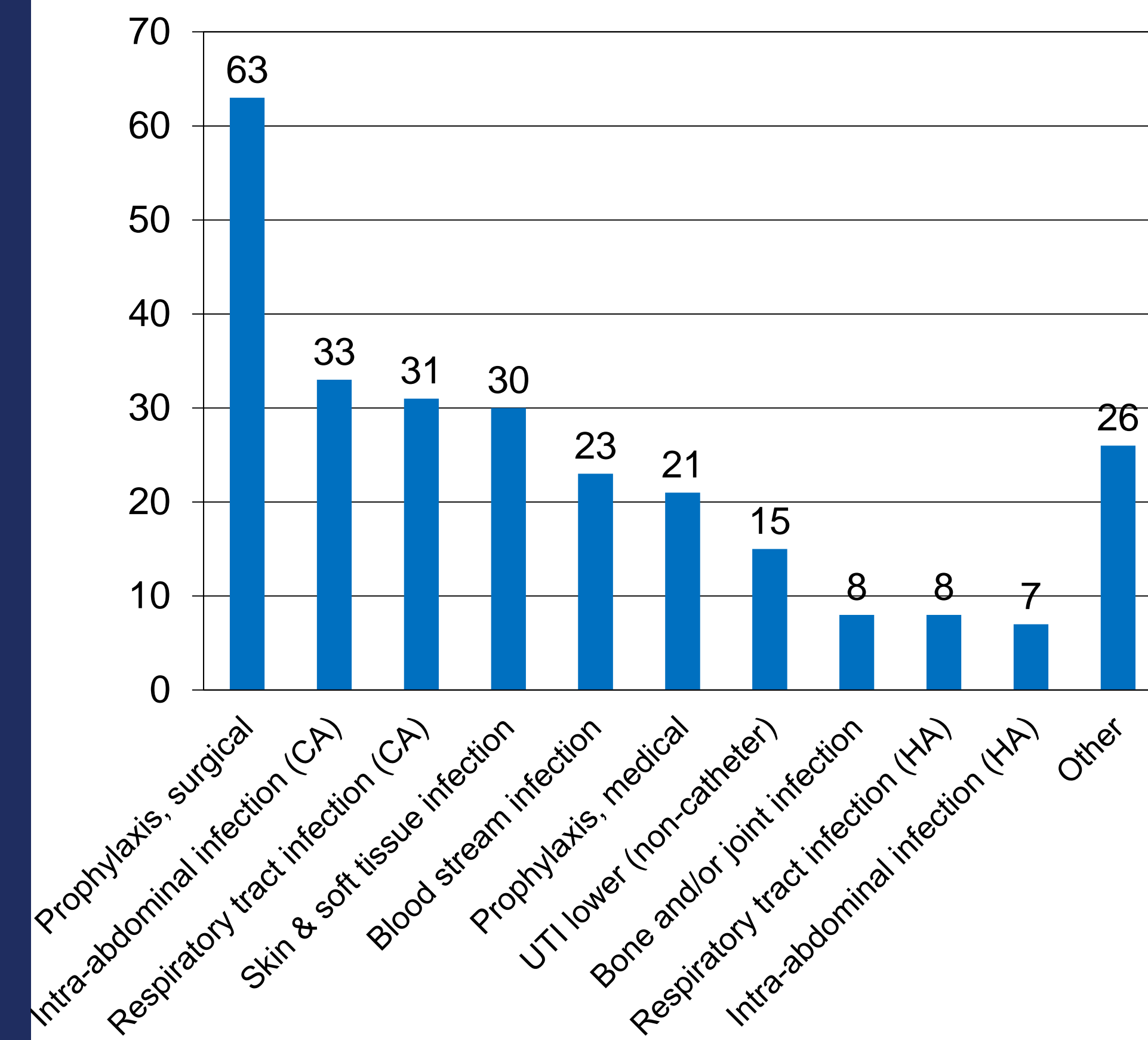


Figure II

Intradermal tests performed

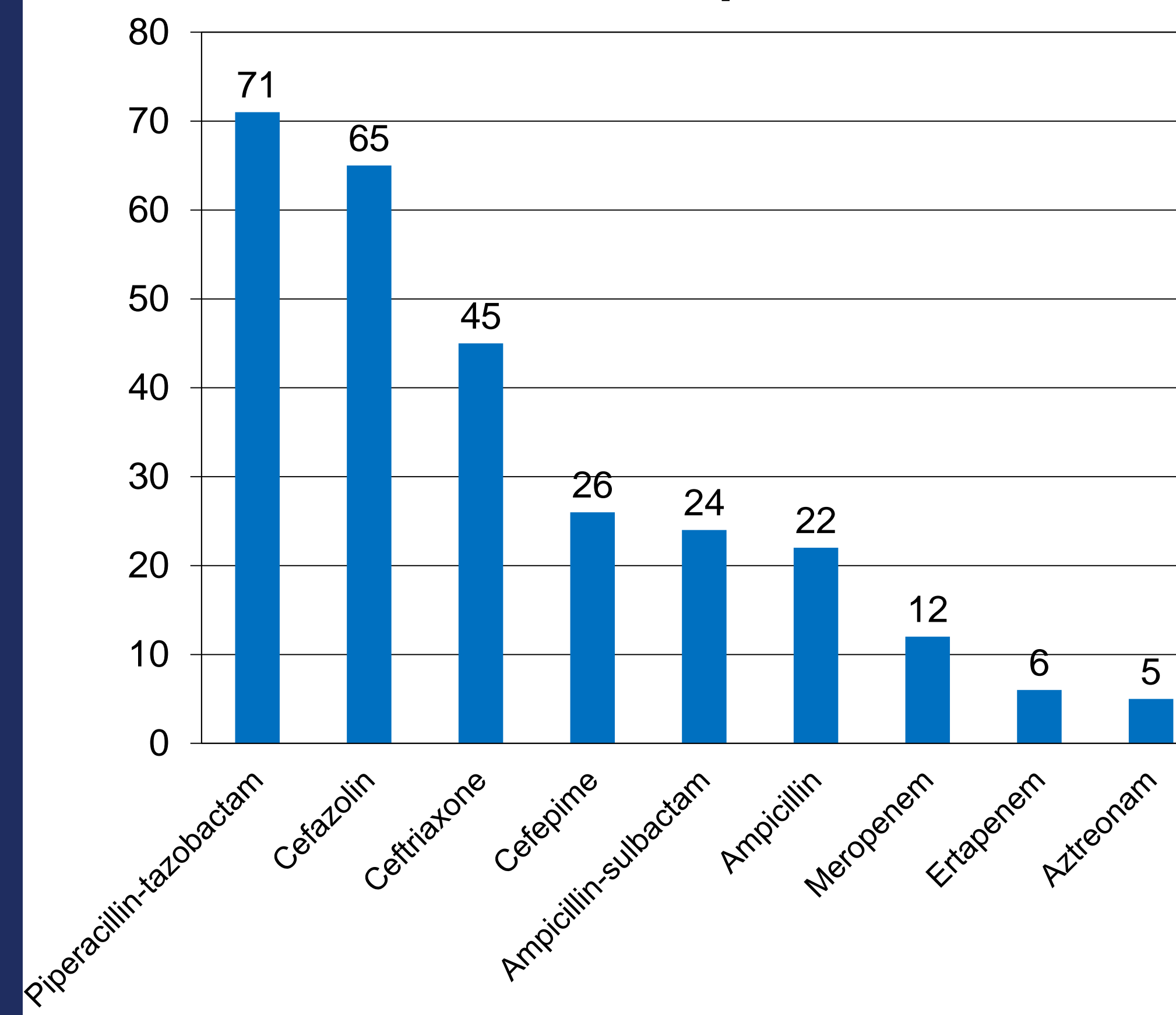
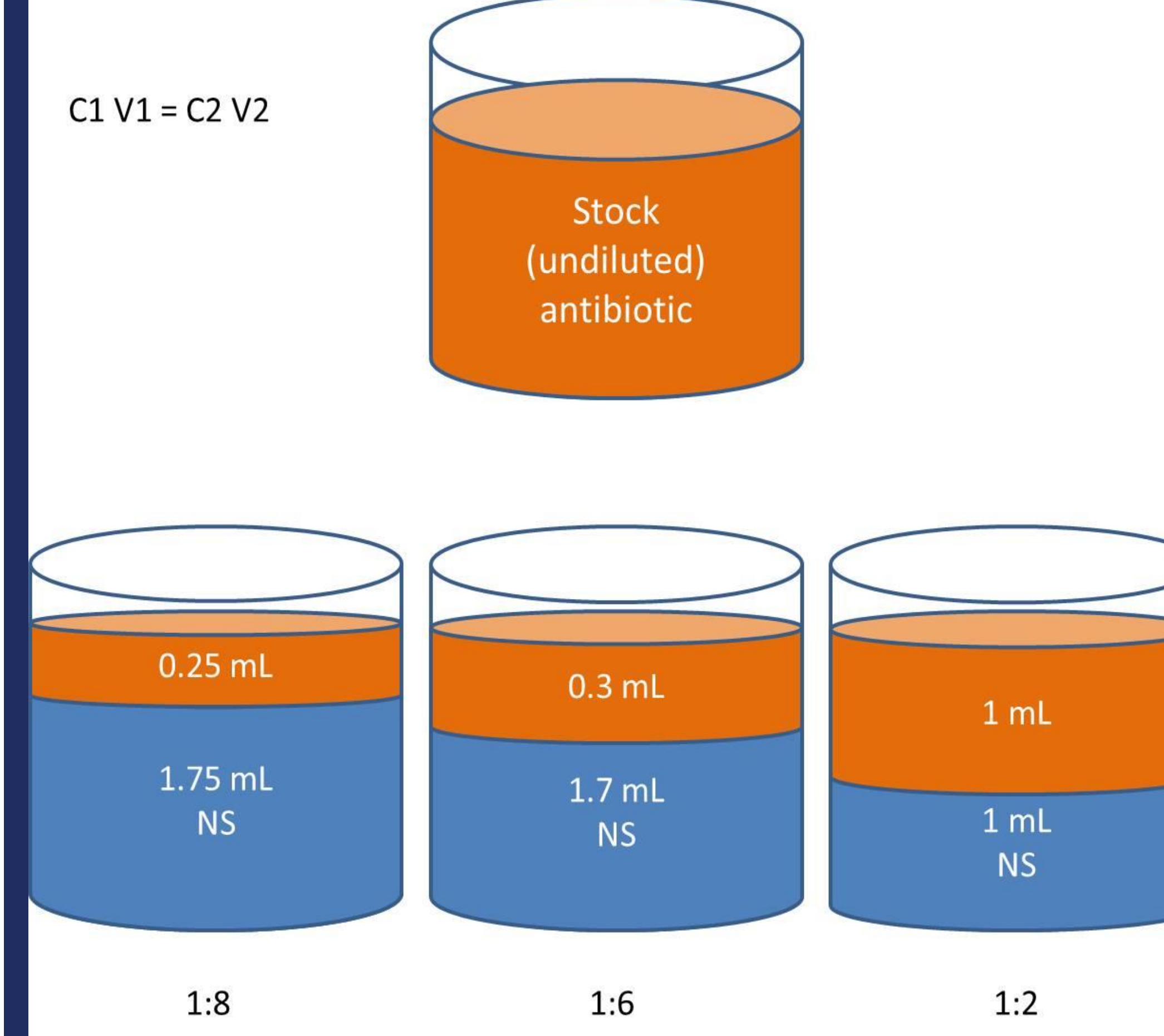


Figure III



Conclusions

- Skin tests with beta-lactam containing antibiotics should be performed using the highest NIC possible (Table I) in order to reduce false negative results and to improve diagnosis and delivery of care.
- NIC to the tested beta-lactam containing antibiotics were found to be higher than what has been proposed to date.
- We propose an easy method to dilute these antibiotics to their highest NIC that can be helpful in day-to-day clinical practice.
- This study and future others may help improving diagnosis of allergy or lack thereof to these antibiotics.

Methods

- All enrolled patients had received at least one dose of a systemic beta-lactam containing antibiotic without adverse reactions.
- Negative (normal saline) and positive (histamine) controls were used in all tests.
- Initial intradermal (ID) wheal size was 3-5 mm and results were read 15 minutes after injection.
- An increase in ID wheal size by more than 3 mm compared to negative control and the appearance of a flare was considered positive.

Table I

Tested dilutions and respective concentrations*

Tested antibiotic (stock concentration)	1:100	1:10	1:8	1:6	1:4	1:2	Undiluted
Ampicillin (250)	2.5	25	31.2	41.6	62.5	125	NP
Ampicillin-sulbactam (375)	3.7	37.5	46.8	62.5	93.7	187.5	NP
Aztreonam (50)	0.5	5	6.2	8.3	12.5	25	NP
Cefazolin (330)	3.3	33	41.2	55	82.5	165	NP
Cefepime (280)	2.8	28	35	46.6	70	140	NP
Ceftriaxone (350)	3.5	35	43.7	58.3	87.5	175	NP
Ertapenem (100)	1	10	12.5	16.6	25	50	NP
Meropenem (50)	0.5	5	6.2	8.3	12.5	25	NP
Piperacillin-tazobactam (225)	2.25	22.5	28.1	37.5	56.2	112.5	225

NP= Not performed
*Concentrations are in mg/mL
Highest non-irritating concentration

References

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2. Drug allergy: an updated practice parameter. Annals of allergy, asthma & immunology : official publication of the American College of Allergy, Asthma, & Immunology. 2010;105(4):259-73.
3. Empedrad R, Darter AL, Earl HS, Gruchalla RS. Nonirritating intradermal skin test concentrations for commonly prescribed antibiotics. The Journal of allergy and clinical immunology. 2003;112(3):629-30.