

# Penicillin allergy drives greater adherence to antibiotic guidelines: pooled data on prescribing and allergy documentation from two English NHS Trusts

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## Introduction

It has been reported that patients with penicillin allergy receive more non-adherent antimicrobial therapy compared to those without antimicrobial allergy. However, it is unclear if patients with penicillin allergy are more likely to be prescribed antibiotics that are adherent to guidelines if clear recommendations for alternative agents in penicillin allergy are provided.

## Objective

To determine the prevalence of antimicrobial allergy and investigate the impact of penicillin allergy on adherence to antibiotic guidelines.

## Methods

The study was conducted at two large tertiary referral NHS trusts. We studied inpatients treated for; community acquired pneumonia (CAP), hospital acquired pneumonia (HAP), skin and soft tissue infection (SSTI) and urinary tract infection (UTI). Both trusts use electronic medical records and have treatment guidelines for these indications with clear recommendations on alternate agents for use in penicillin allergy. Data were collected from patients admitted between 13-24 February 2017. Trust 1 data were obtained from a prospective point prevalence study collected over 8 days. Trust 2 data were obtained retrospectively from an electronic medical record report. Documentation of allergy/adverse drug reaction status was recorded as either 'allergy', 'side-effect' or 'no documentation of allergy'. Selection of antibiotic agent was assessed for adherence to respective trust guidelines.

## Results

Data were obtained from 207 and 591 patients at trusts 1 and 2 respectively, to give a total of 798 patients. Patient characteristics, allergy labelling and indication for antibiotics are shown in Table 1. Penicillin allergy accounted for 135 (55.3%) of all antimicrobial allergies. Patients with a documented penicillin allergy had their status recoded as: allergy (29; 21.3%), side effect (18; 13.3%) or no documentation recorded (88; 65.2%). Adherence to treatment guidelines for each indication was >80%. Overall guideline adherence was 1184/1436 (82.5%) for all prescriptions, with guideline adherence greater for patients with penicillin allergy (243/279; 87.1%) vs no penicillin allergy (941/1157; 81.3%). Adherence for CAP prescriptions was (421/552; 76.3%); patients with penicillin allergy had increased prescription adherence to recommended antibiotics (80/85; 94.1%) vs those without penicillin allergy (341/467; 73%). For the indications of SSTI, HAP and UTI there were no significant differences between those with or without penicillin allergy (Fig 1). The odds of receiving guideline adherent antibiotics was greater in patients with penicillin allergy compared to those without [OR 0.65 (95%CI 0.43-0.95) p=0.02]. This was most pronounced for CAP [OR 0.17 (0.05-0.43) p<0.001] (Table 2).

## Discussion and Conclusions

Allergy to any antimicrobials was detected in around one-quarter of all patients treated for the four indications. Penicillin allergy was the most common antimicrobial allergy present in around half of those with documented antimicrobial allergy. The high proportion of patients with penicillin allergy having no documentation regarding the nature of the reaction is alarming. Those patients with penicillin allergy were more likely to be prescribed guideline adherent antibiotics compared to those without penicillin allergy. This unexpected finding was principally driven by poor adherence to trust guidelines for patients with CAP. A previous study of the impact of allergy on antibiotic prescribing found penicillin allergy was associated with inappropriate prescribing<sup>1</sup>, however it is unclear whether the participating sites had local guidelines, and if these included advice for penicillin allergy. The trusts in our study had readily accessible treatment guidelines. We propose the presence of penicillin allergy may, perhaps counterintuitively, improve prescribing behaviour as clinicians are prompted to consult locally endorsed guidelines. While the study was conducted in tertiary referral centres, the indications selected for this study are commonly seen in most hospitals across the UK and overseas, so these findings may well be generalisable.

Table 1: Patient characteristics

Characteristic	n=798
Age, years median (interquartile range)	74 (54-83)
Specialty	
Medicine	377 (47.2)
Acute Medicine	159 (19.9)
Elderly Medicine	66 (8.3)
Specialist Surgical	133 (16.7)
General Surgical	41 (5.1)
Paediatrics	17 (1.7)
Private	5 (0.6)
Allergy label	
No known drug allergy	408 (51.1)
Allergy to non-antimicrobial	182 (22.8)
Penicillin allergy	135 (16.9)
Allergy to ≥1 non-penicillin antimicrobial	59 (7.4)
No documentation	14 (1.8)
Indications	
Community acquired pneumonia	272 (34.1)
Urinary tract infection	224 (28.1)
Hospital acquired pneumonia	178 (22.3)
Skin & soft tissue infection	124 (15.3)

Fig. 1: Antibiotic prescriptions adherent to trust guidelines

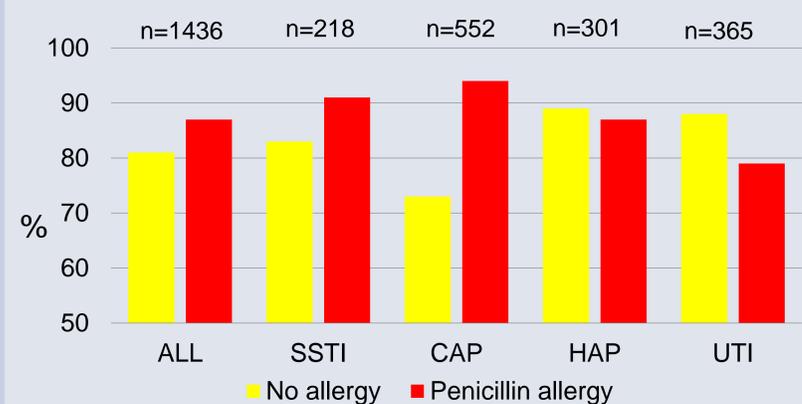


Table 2: Odds of receiving guideline adherent antibiotic prescription for no allergy vs. penicillin allergy

Indication	Odds Ratio (95% CI)	P value
All	0.65 (0.43-0.95)	0.02
Skin and soft tissue infection	0.51 (0.15-1.45)	0.18
Community acquired pneumonia	0.17 (0.05-0.43)	<0.001
Hospital acquired pneumonia	1.50 (0.63-3.37)	0.29
Urinary tract infection	1.87 (0.89-3.80)	0.06

## Reference

1. Trubiano JA et al. Antimicrobial allergy labels drive inappropriate antimicrobial prescribing: lessons for stewardship. *J Antimicrob Chemother* 2016;71:1715-22.