

Accuracy of Penicillin Allergy Risk Severity Documentation in Surgical Patients

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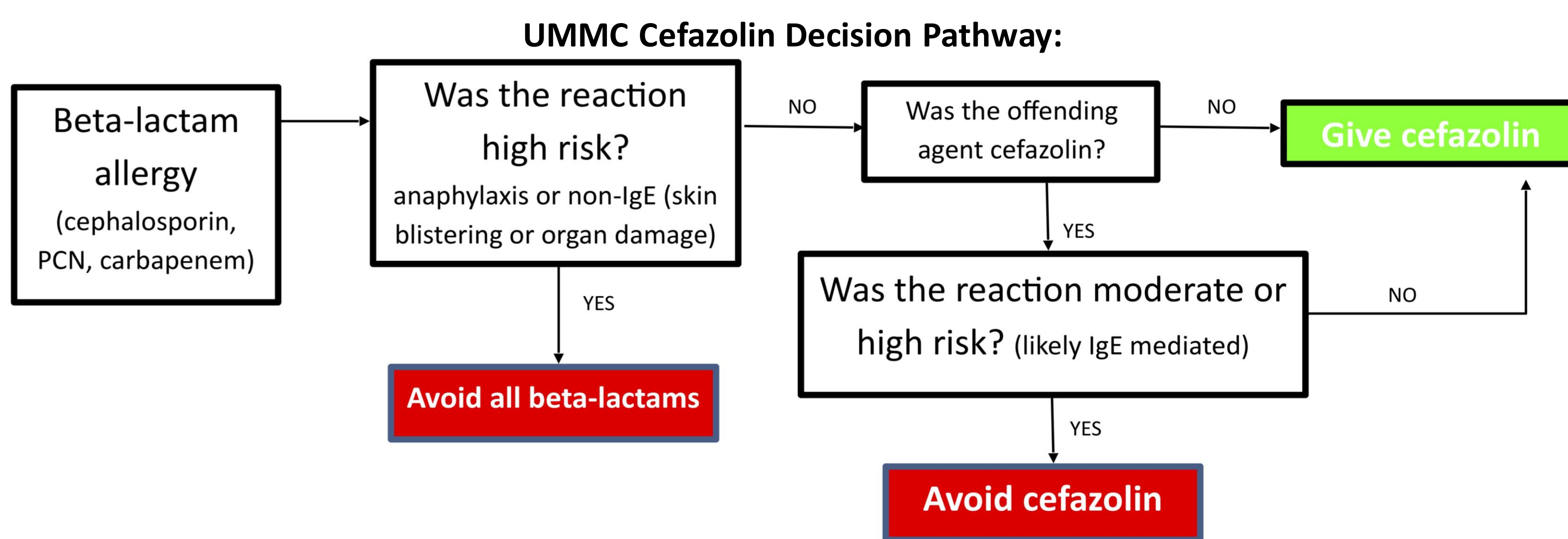
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BACKGROUND

- 36% of patients have at least one reported drug allergy¹
 - Penicillin (PCN) is the most common 12.8%
- True IgE mediated reaction is rare:
 - 9/10 not allergic when assessed by skin testing¹
- Patients labeled penicillin allergic have:
 - Longer hospital stays and more readmissions
 - Increased rates of healthcare-associated infections and MDR infections
 - Increased use of broad-spectrum antibiotics and higher antibiotic cost²
- Cefazolin is first-line for surgical antimicrobial prophylaxis
 - Estimated cross-reactivity with IgE mediated PCN allergy is 3%³



STUDY DESIGN & METHODS

- Purpose:**
 - Quality improvement study to investigate accuracy of allergy risk assessment in penicillin allergic patients and the impact on surgical antibiotic prophylaxis
- Retrospective observational cohort study**
 - Reviewed medical record data of 2647 patients who underwent 2873 procedures at UMMC between 3/1/19 - 2/29/20
- Primary outcome:**
 - Incidence of appropriate documentation of allergy risk severity
 - Allergy risk classification was considered appropriate if it aligned with institutional guidelines

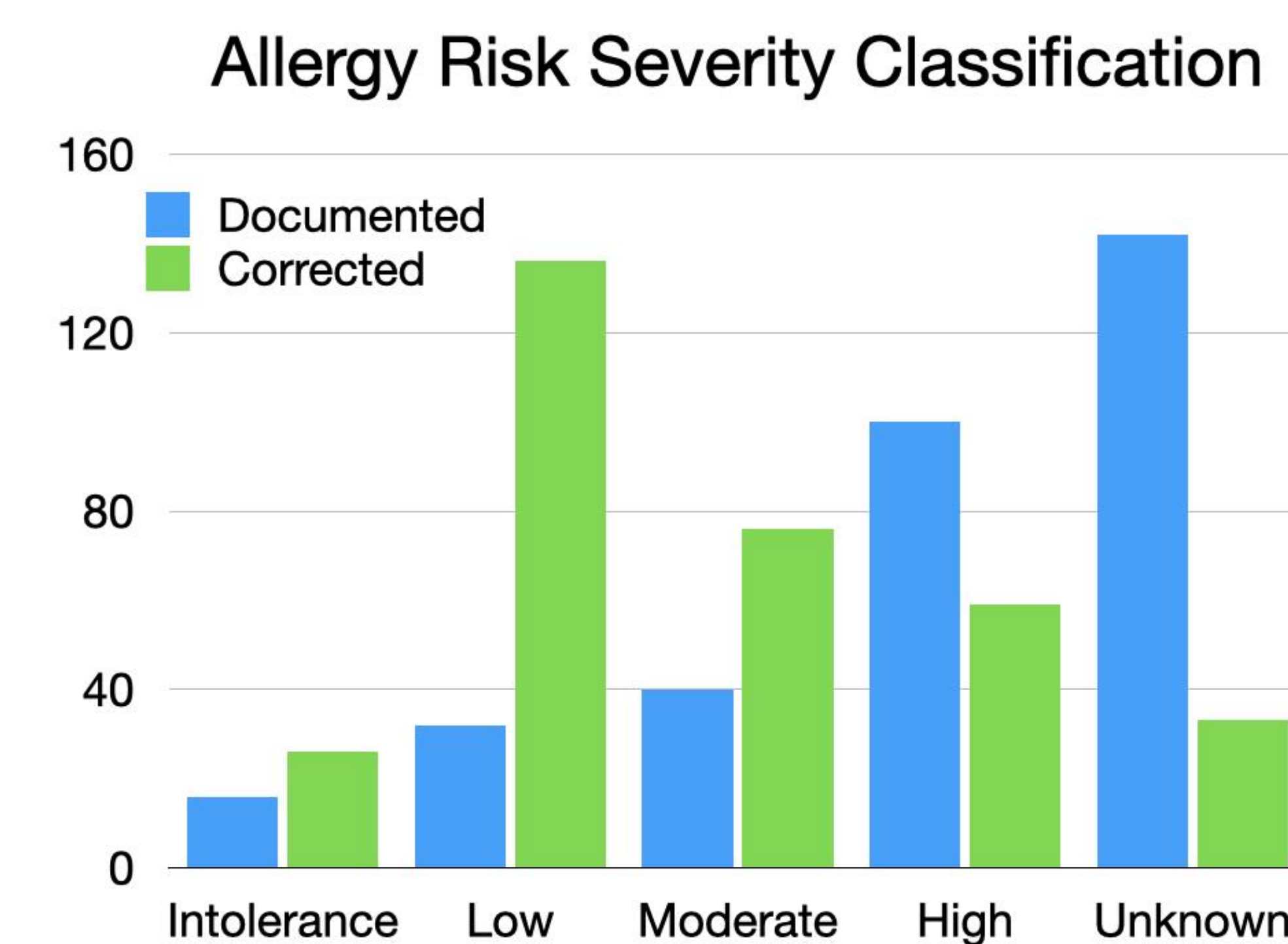
UMMC Penicillin Allergy Risk Categories:

Intolerance:	Low Risk:	Moderate Risk:	High Risk:
<ul style="list-style-type: none"> Isolated GI upset (N/V/D) Chills/rigors Headache Fatigue 	<ul style="list-style-type: none"> Family history Itching (pruritus) Unknown, remote (>10 years) Rash (>1 yr ago) Patient denies allergy but has reported history 	<ul style="list-style-type: none"> Cough Throat tightness Shortness of breath Wheezing Dizziness Angioedema/ swelling Rash (<1 year ago) Urticaria 	<ul style="list-style-type: none"> Anaphylaxis Stevens-Johnson (SJS) Drug reaction with eosinophilia (DRESS) Serum sickness Acute interstitial nephritis Fever Anemia Thrombocytopenia

- Secondary outcomes:**
 - Receipt of beta-lactam for surgical prophylaxis
 - Incidence of documentation to reflect tolerance
 - Rate of surgical site infection

RESULTS

Allergy Risk Classification	Documented n= 330	Corrected n= 330
Intolerance	16	26
Low	32	136
Moderate	40	76
High	100	59
Unknown	142	33



Results: Secondary Outcome – Surgical Site Infection (SSI)

	PCN allergy	No allergy	p-value
SSI identified			
number (% total group)	17 (5)	105 (4.5)	0.58
Age - median (range)	58 (37-77)	55 (18-86)	0.671
Gender - n (%)			
Male	2 (12)	59 (56)	0.001
Female	15 (88)	46 (44)	
BMI - median (range)	32.5 (21.3-45.6)	29 (18.5-67.8)	0.619
Smoking status - n (%)			
Never	8 (47)	48 (46)	1
Former/Current	9 (53)	57 (54)	
Diabetes - n (%)			
None or diet-controlled	9 (53)	84 (80)	0.028
Present	8 (47)	21 (20)	
Charlson Comorbidity Index			
median (range)	3 (1-8)	3 (0-11)	0.766
Wound Class - n (%)			
clean or clean-contaminated	15 (88)	67 (64)	0.054
contaminated or dirty	2 (12)	38 (36)	
Intra-op Duration (minutes)			
median (range)	299 (135-659)	299 (118-744)	0.466
Perioperative Antibiotic - n (%)			
Cefazolin	6 (35)	85 (81)	0.0002
Other	11 (65)	20 (19)	

Secondary Outcomes	Reported PCN Allergy (n = 330)
Peri-operative antibiotic	n (%)
Beta-Lactam	191 (58)
Other	139 (42)
History of beta-lactam tolerance	163 (49)
Allergy record updated:	
Yes	34 (21)
No	129 (79)

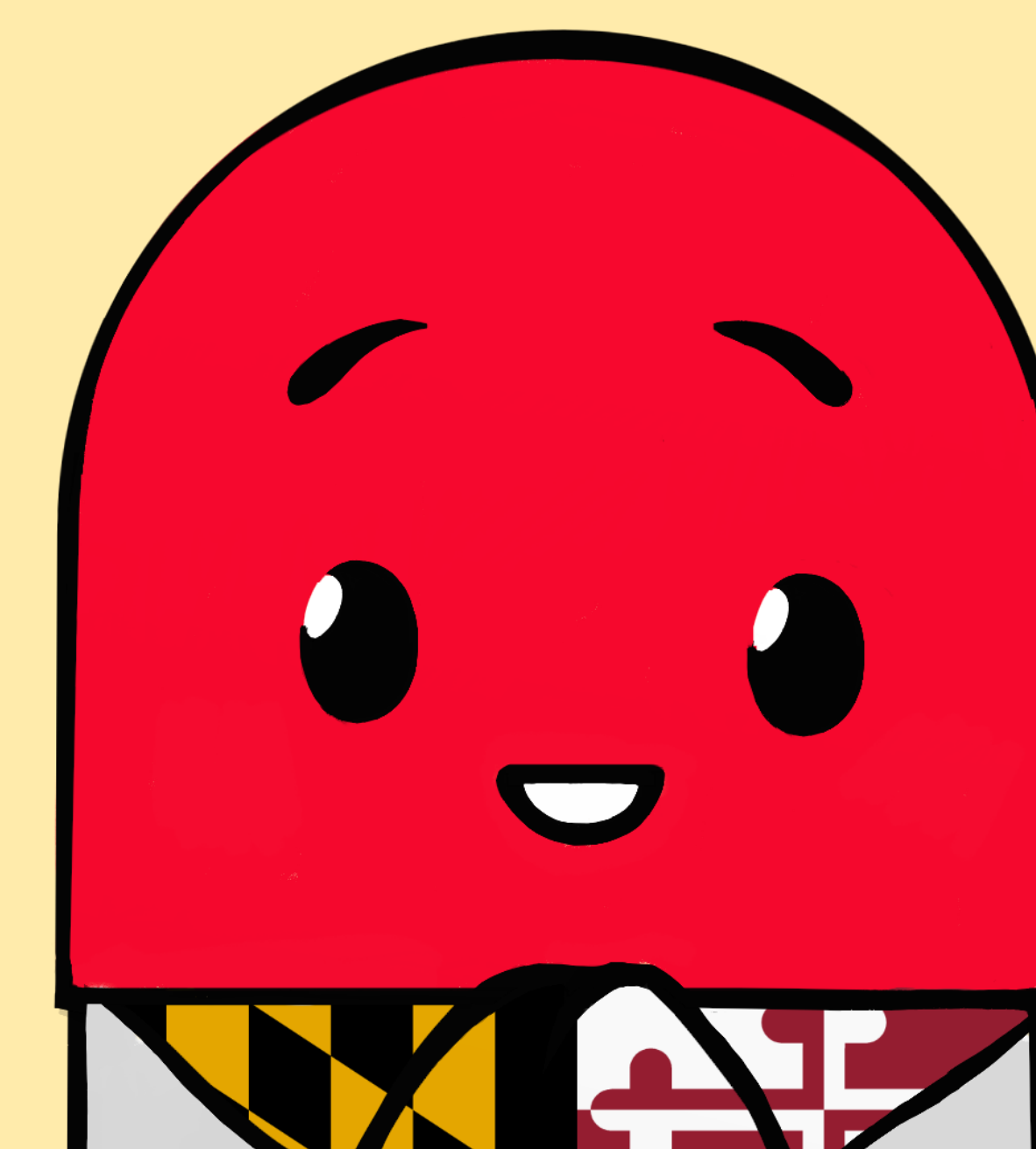
Per our institutional guidelines, at least 72% of penicillin allergic patients in this cohort should have received cefazolin prophylaxis, compared to 58% that did.

CONCLUSIONS

- Documented PCN allergy risk severity was found to be incorrect in 59% of patients.
- There was no significant difference in rate of SSI observed, but PCN allergic patients with SSI are more likely to have received second-line antimicrobial prophylaxis.
- Allergy history was rarely updated to reflect beta-lactam tolerance.
- Interventions targeting allergy history documentation alone could positively impact antibiotic selection and improve patient outcomes.

References:

- Zhou L, Dhopeswarkar N, Blumenthal KG, et al. Drug allergies documented in electronic health records of a large healthcare system. *Allergy* 2016; 71:1305–13.
- Macy E, Contreras R. Health care use and serious infection prevalence associated with penicillin "allergy" in hospitalized patients: A cohort study. *J Allergy Clin Immunol*. 2014 Mar;133(3):790-6.
- Sousa-Pinto B, Blumenthal KG, Courtney L, Mancini CM, Jeffres MN. Assessment of the Frequency of Dual Allergy to Penicillins and Cefazolin: A Systematic Review and Meta-analysis. *JAMA Surg*. 2021 Apr 1;156(4):e210021.



Take-home Point:

Penicillin allergy risk severity is often incorrectly documented in the medical record, resulting in decreased use of first-line antimicrobial prophylaxis.