UWTASP
tele-antimicrobial stewardship program

PEN-FAST for Penicillin Allergy De-Labelling

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Project ECHO®

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Background

Penicillin allergy labels are associated with **health and economic costs** including:

- Treatment failure
- Increased resistance
- Adverse drug events
- Longer hospital stays
- Higher hospital readmission rates

Three general strategies for de-labelling:

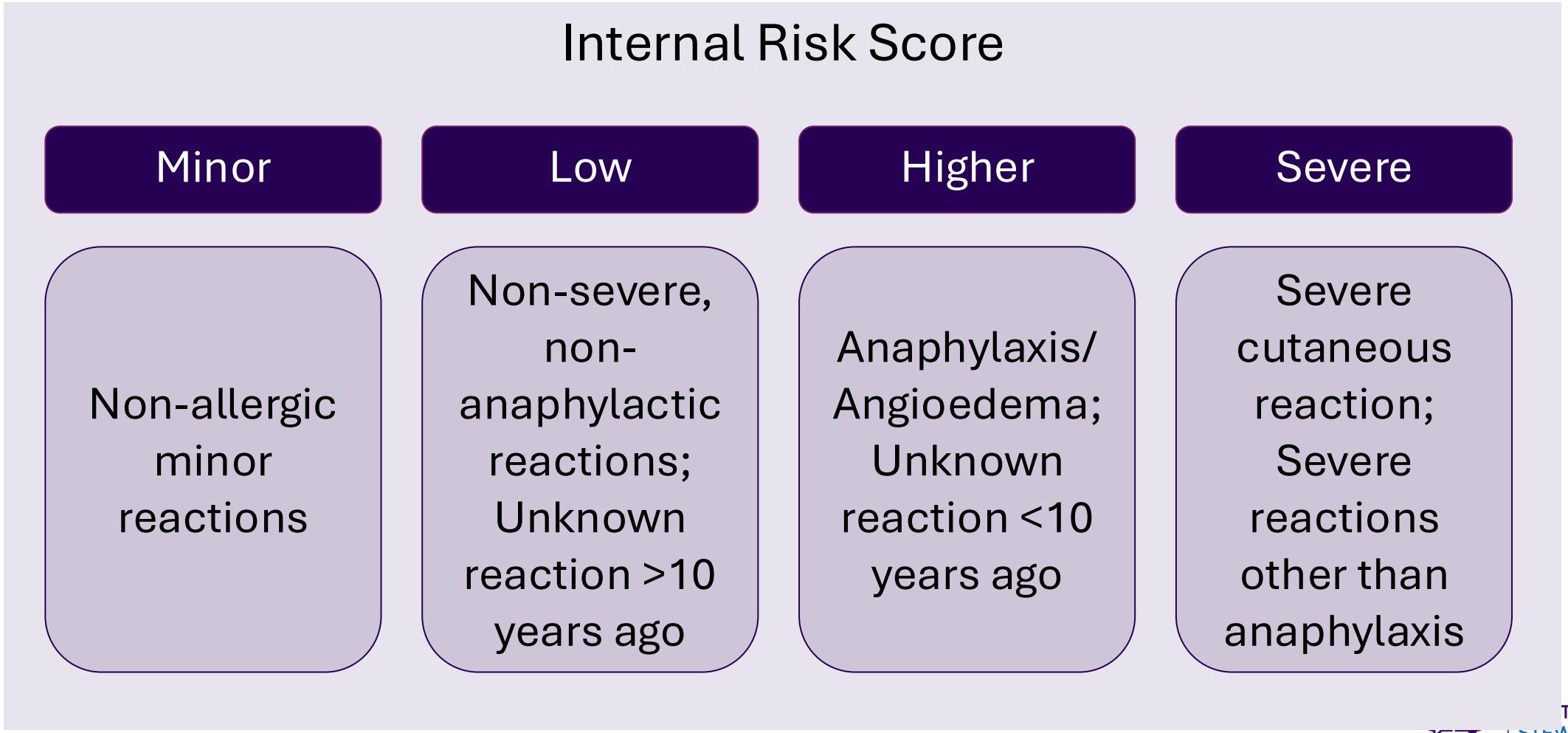
- Based on medical history alone
- Direct oral amoxicillin challenge
- Skin testing

~10% of admitted patients have a documented penicillin allergy

Over 90% of these allergies can likely be safely de-labelled

Jiang M. *Int Arch Allergy Immunol*. 2025
Stone CA. *Allergy*. 2020
Rozłucka L. *J Clin Med*. 2024

Risk Stratification Score: Internal Risk Score



Risk Stratification Score: PEN-FAST

PEN-FAST Score

A score of 2 or less signifies low risk of penicillin allergy

- Five or fewer years since allergy episode/unknown (2 points)
- Anaphylaxis/angioedema/severe cutaneous reaction (2 points)
- Treatment required for allergic reaction/unknown (1 point)

Arasaratnam RJ. *Open Forum Infect Dis*. 2024
Copaescu AM. *JAMA Intern Med*. 2023
Trubiano JA. *JAMA Intern Med*. 2020
Guastadisegni JM. *Antimicrob Steward Healthc Epidemiol*. 2024

Objectives

Primary Objectives

1. Estimate prevalence of penicillin allergy among hospitalized patients with an Infectious Diseases (ID) consultation
2. Determine the proportion of patients that can be de-labelled by history alone or oral amoxicillin challenge

Secondary Objective

1. Determine the concordance between PEN-FAST score and internal risk score calculator

Methods

Study Design

- Retrospective feasibility study
- 7/1/2023 – 6/30/2025

Inclusion Criteria

- Adult hospitalized patients with ID consultation
- Penicillin allergy (penicillin, amoxicillin, ampicillin, ampicillin-sulbactam, amoxicillin-clavulanate, dicloxacillin, piperacillin)

Results – Demographics

Characteristics	N = 243
Age, mean (SD)	56.4 (16.6)
Sex, n (%)	
Male	136 (56.0)
Female	106 (43.6)
Other	1 (0.4)
Race, n (%)	
American Indian/Alaskan Native	14 (5.8)
Asian or Asian American	19 (7.8)
Black or African American	22 (9.1)
Hawaiian/Pacific Islander	2 (0.8)
White	178 (73.3)
Other	4 (1.6)
Multi-racial	0 (0.0)
Unknown	4 (1.6)
Ethnicity, n (%)	
Hispanic	12 (4.9)
Non-Hispanic	222 (91.4)
Unknown	9 (3.7)

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Results – Primary Outcomes

7/1/2023 – 6/30/2025
6,125 patients with ID consultation

Of 6,125 patients, **819 (13.4%)** with reported penicillin allergy

1/1/2025 – 6/30/2025
243 patients with penicillin allergy selected for further evaluation

Patients eligible for de-labelling:

Total: **143 (58.8%)**

History alone: **30 (12.3%)***

*Among living patients with an active allergy label

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Results – Secondary Outcome

- There was concordance between the PEN-FAST score and the internal tool in 222 (91.4%) patients (K 0.82, 95% CI 0.75-0.90).

PEN-FAST Score	n (%)
0	40 (16.5%)
1	97 (39.9%)
2	6 (2.5%)
3	79 (32.5%)
4	1 (0.4%)
5	20 (8.2%)

Internal Risk Score	n (%)
Minor	23 (9.5%)
Low	115 (47.3%)
Higher	91 (37.4%)
Severe	14 (5.8%)

Concordance, n	≤2	>2
Minor/Low	130	8
Higher/Severe	13	92

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Risk Stratification Scores

- PEN-FAST > 2, Internal score low risk
  - Maculopapular rash (Internal = low risk)
    Timeframe and treatment (PEN-FAST = 3)
- PEN-FAST ≤ 2, Internal score higher risk
  - Remote anaphylaxis (Internal = higher)
    Never got treatment (PEN-FAST = 2)
  - Unknown reaction within 10 years (Internal = higher)
    More than 5 years ago (PEN-FAST = 1)
- Of the 21 patients with discordant scores, 16 (76.2%) received a penicillin or cephalosporin inpatient, of which 50% had a similar side chain to penicillin.

Internal Risk Score

Minor	Low	Higher	Severe
Non-allergic minor reactions	Non-severe, non-anaphylactic reactions; Unknown reaction >10 years ago	Anaphylaxis/ Angioedema; Unknown reaction <10 years ago	Severe cutaneous reaction; Severe reactions other than anaphylaxis

PEN-FAST Score

A score of 2 or less signifies low risk of penicillin allergy

- Five or fewer years since allergy episode/unknown (2 points)
- Anaphylaxis/angioedema/severe cutaneous reaction (2 points)
- Treatment required for allergic reaction/unknown (1 point)

Conclusion

- The prevalence of penicillin allergy at our hospital is **consistent** with previously published data
- **Over half** of documented penicillin allergies are eligible to be de-labelled by medical history or amoxicillin challenge
- The PEN-FAST score was **validated** against an internal risk score calculator and is an effective allergy de-labelling tool
- Further exploration of implementing the PEN-FAST score into daily practice is warranted

Future Directions

1. What is the optimal time to de-label penicillin allergies?
2. How can we utilize front-line staff to help de-label?
3. Can AI increase efficiency in using the PEN-FAST score?

Takeaways

- Nursing:
  - Incorporate PEN-FAST score into allergy assessments prior to adding an allergy to the patient chart and when de-labelling
- Pharmacy:
  - Incorporate PEN-FAST score into daily stewardship workflow
- Physician:
  - Use PEN-FAST score when ordering antibiotics and to help assess if an oral amoxicillin challenge is warranted

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References

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Questions?

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Teaching Evaluation: please fill out!

Teaching Evaluation for Montana Panec: Penicillin Allergy

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