



# Empowering Nonallergists to Evaluate Penicillin Allergy Labels

Shyam Joshi, MD

Assistant Professor of Medicine

Oregon Health and Science University

# Disclosures

- I have no actual or potential conflict of interest in relation to this presentation.

# Background

- 8-12% of the US population carries a history of penicillin allergy
  - >95% will tolerate penicillin use after evaluation
  - Vast majority of patients never undergo evaluation to determine the accuracy or persistence of allergy
- Outcomes Measures in those with PCN Allergy Label
  - Higher utilization of non- $\beta$ -lactam antibiotics
  - Higher rate of treatment failure
  - Increased healthcare costs
  - Increased prevalence of C diff, MRSA, and VRE
  - Increase in average hospital days
  - Increased risk of surgical site infections

Macy E, Contreras R. *J Allergy Clin Immunol*, 2014.  
Jeffres MD, et al. *J Allergy Clin Immunol*, 2016.  
Picard M, et al. *J Allergy Clin Immunol Pract*, 2013.  
Blumenthal KG, et al. *Clin Infectious Dis*, 2018.

# Challenges to Delabeling

- High rate of relabeling after negative testing/challenge (26-49%)
- Inadequate number of Allergy specialists
  - 32 million patients with label and only ~4500 Allergists
- Engaging nonallergy providers (and administration) to perform testing
  - Emergency clinicians, internists, intensivists, pharmacists, ID specialists

Warrington RJ, Lee KR, McPhillips S. *Allergy Asthma Proc.* 2000;21(5):297-9.  
Gerace KS, Phillips E. *J Allergy Clin Immunol Pract.* 2015;3(5):815-816.  
Rimawi RH, Shah KB, Cook PP. *Journal of Hospital Medicine.* 2013;8:615-618.  
Bourke J, Pavlos R, James I, et. al. *J Allergy Clin Immunol Pract.* 2015;3:365-74.

# Unanswered Questions/Hypothesis

1. Can nonallergy providers effectively and safely perform penicillin allergy evaluations independently?
  - Hypothesis: Nonallergist providers can effectively and safely perform penicillin allergy evaluations independently.
2. Would the above penicillin allergy delabeling services improve clinical outcomes?
  - Nonallergist-driven penicillin allergy delabeling services can improve antimicrobial stewardship, healthcare costs, and other clinical outcome measures.
3. From a population medicine perspective, would broader use of penicillins reduce antibiotic resistance?

# Approach for Nonallergist Delabeling

1. Pharmacist (with Allergist oversight)
  - UTSW/Parkland Inpatient Penicillin Allergy Service
2. Hospitalist/Intensivist
  - BWH Inpatient Protocol
3. Emergency Department
  - UC ED Protocol
4. Infectious Disease Service
  - University of Maryland ID Fellows

Shenoy ES, et al. *JAMA*, 2019.

Chen JR, et al. *J Allergy Clin Immunol Pract*, 2017.

Blumenthal KG, et al. *J Allergy Clin Immunol Pract*, 2017.

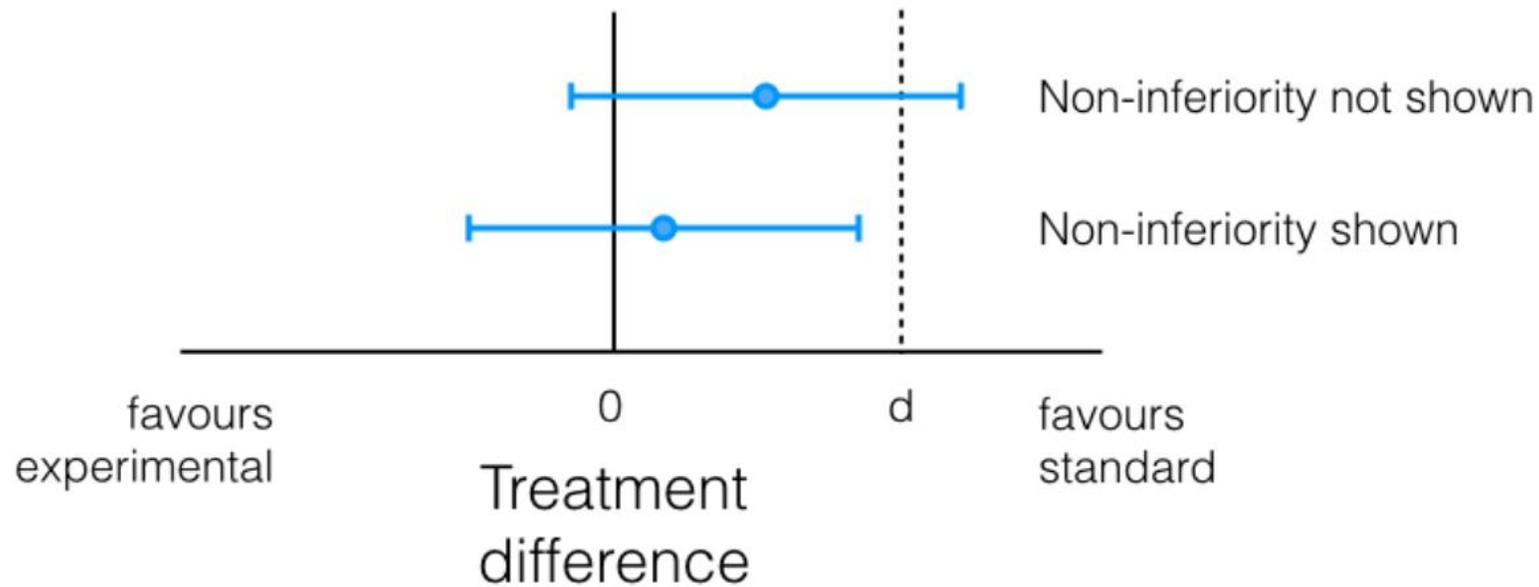
Raja AS, et al. *Ann Emerg Med*, 2009.

Heil EL, et al. *Open Forum Infect Dis*, 2016.

# Proposed Project

- Multidiscipline approach in several clinical settings with general oversight by an Allergist
  1. Inpatient: Pharmacist-driven inpatient service
  2. Emergency Department: EM providers
  3. Perioperative: Anesthesiology and Perioperative Medicine
  4. Outpatient: Primary Care

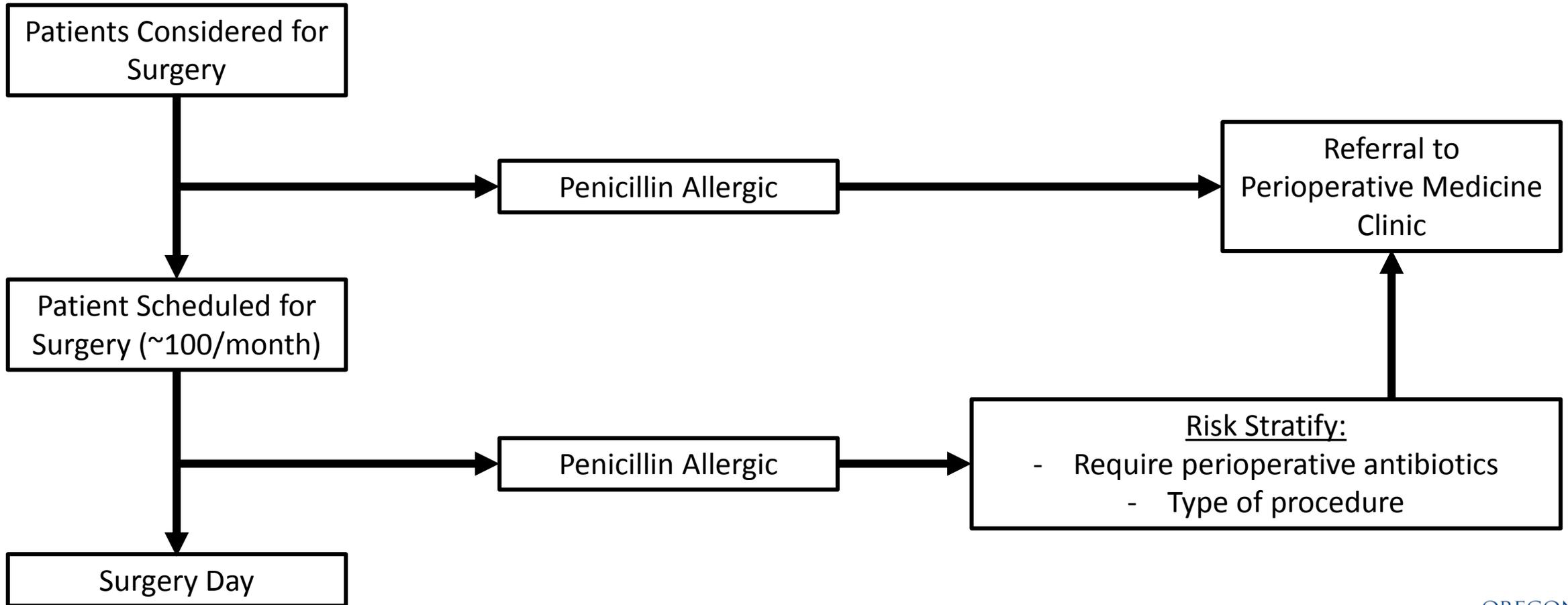
# Noninferiority Study

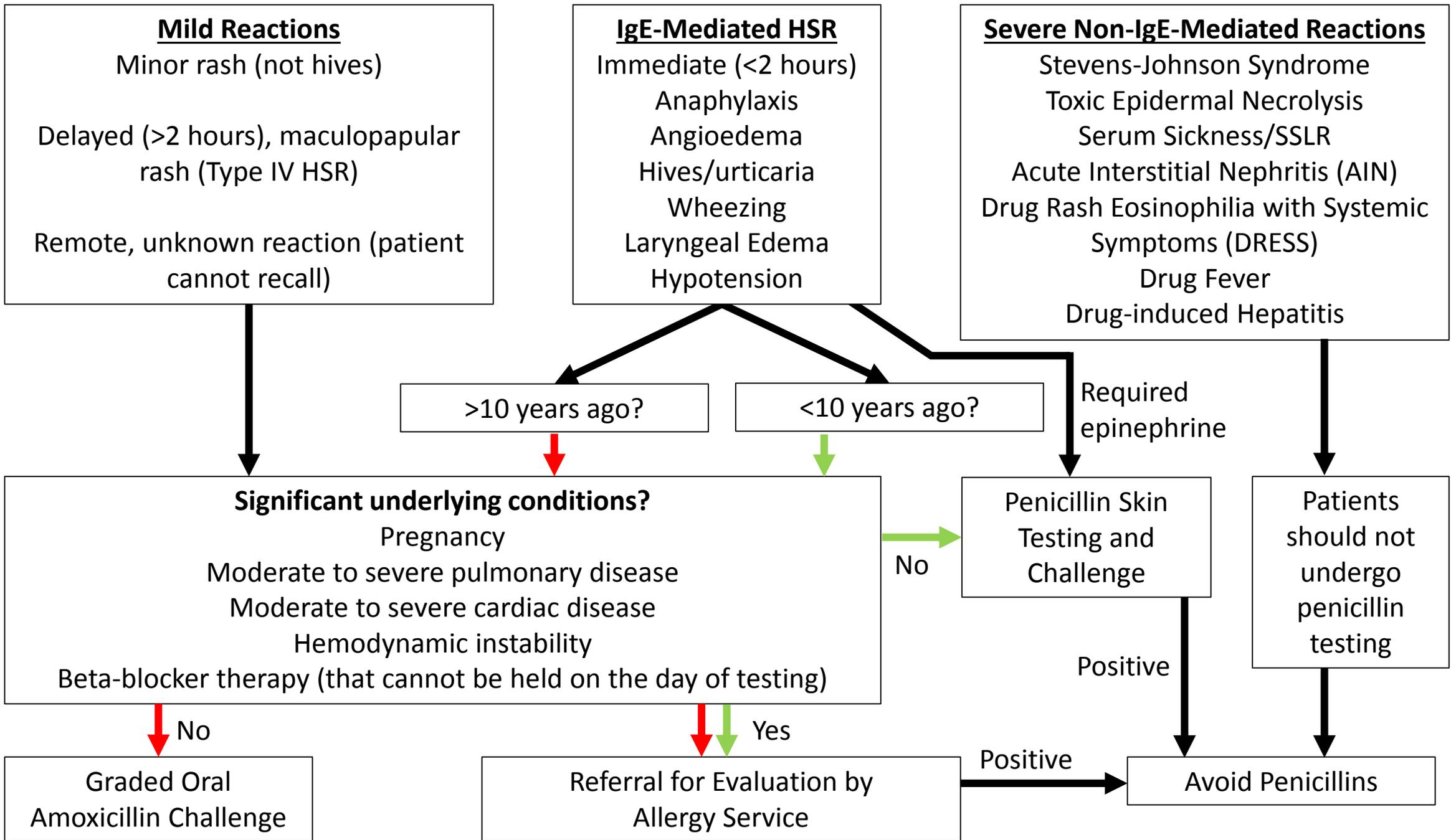


Significance: 5%  
Power: 90%  
Label removal rate: 98%  
Non-inferiority limit (d): 2%

N = 374

# Perioperative PCN Allergy Delabeling





# Perioperative PCN Allergy Delabeling

- Hypothesis #1 (Nonallergists can perform testing effectively and independently)
  - Proof of concept
  - Noninferiority evaluation compared to allergist-driven process
- Hypothesis #2 (Outcome data)
  - Historical case controlled study
  - Comparing perioperative outcome data between before and after implementation

# Outpatient PCN Allergy Delabeling

- Primary care evaluation
  - OHSU Outreach Clinics
  - Rural medicine (Yamhill CCO)
- Risk stratify based on algorithm
  - Low-risk: Observed graded challenge at PCP office
  - Moderate-risk: Skin testing at PCP office
  - High-risk: Allergy referral

# Outcome Measures

- Healthcare providers and clinical setting involvement
  - Number of patients evaluated
- **Penicillin allergy label removal** → **Goal sample size would be 374 patients**
  - Relabel rate
  - Adverse events (procedure and reactions)
- Clinical Outcomes
  - Antibiotic stewardship
  - SSI/Revision rate
  - Hospital days, readmission rate
  - Cost-effectiveness

# Anticipated Obstacles

## Study

- Institutional participation
  - “Red tape”
  - Staffing
  - Clinic space
- Tracking clinical and financial outcomes
  - Many will be long-term

## Paradigm of Care

- Provider participation
  - Interest, willingness, and capability
- Allergists reluctance due to lost direct revenue

# Acknowledgements

- Oregon Health and Science University
  - Dio Sumagaysay, RN
  - Avital O'Glasser, MD
  - Yoojin Kim, PhD
  - Ellie Sukerman, MD
  - James Lewis, PharmD
- Previous mentor/colleagues
  - Dave Khan, MD, FAAAAI
  - Felicia Kasra, PharmD
- AAAAI Faculty Development Mentor
  - Alkis Togias, MD, FAAAAI

