Penicillin Allergy 101
For Nurses

Nurses Take Antibiotic Stewardship Action Initiative

This material was supported in part by a U.S. Centers for Disease Control and Prevention (CDC) contract to Johns Hopkins University.

The Department of Antimicrobial Stewardship, The Johns Hopkins Hospital:
• Valeria Fabre, MD
• Sara E. Cosgrove, MD, MS
• Lauren Rosales, BA, BSN-RN

The Office of Antibiotic Stewardship, Centers for Disease Control and Prevention:
• Arjun Srinivasan, MD
• Lauri Hicks, DO
• Melinda Neuhausser, PharmD

Disclaimer: The conclusions in this presentation are those of the JHU authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.
Important Points About Penicillin Allergies

• About 10% of the US population reports a penicillin (PCN) allergy
  – Most PCN allergies are not true allergies (>95%)  
  – The most common reaction is a delayed-type rash that does not preclude subsequent receipt of PCN or other antibiotics in the PCN family  
  – Anaphylaxis is extremely rare (0.001%)

• Patients with a penicillin allergy label (whether true or not) have worse clinical outcomes  
  – Increased risk of developing surgical site infections  
  – Increased risk of failing therapy for an infection  
  – Increased length of stay
Common Reasons For Incorrect PCN Allergy

• Viral rash occurring at the same time antibiotics are taken (e.g., amoxicillin and viral infectious mononucleosis)

• Patients have a family member with a PCN allergy and feel they may have it as well

• Adverse events related to antibiotics:
  – Isolated headaches, nausea, vomiting or diarrhea
  – Itching without rash
  – Vaginal burning
How Can Nurses Help Ensure Patients Are Not Incorrectly Labeled With A PCN allergy and Receive Optimal Antibiotic Therapy?

• Document antibiotic allergies accurately
  • When did it happened?
  • What happened? And How soon after the antibiotic?
  • What antibiotic?

• Learn the differences between hives and a delayed maculopapular rash

• Educate patients about PCN allergy
Hives

- Itchy, red bumps with white centers ("mosquito bite" appearance)
- Usually occurs within 6 hours of antibiotic administration
- Bumps disappear after a few hours and new ones may appear
- Predicted by skin test
- Allergy evaluation required before use of same drug or closely related antibiotic
Maculopapular rash

• This is the most common rash patients experience with PCN, amoxicillin, ampicillin, cephalosporins

• Usually occurs after ≥72 hours of antibiotic exposure

• NOT predicted by skin tests

• Feels rough to touch

• Most often the reaction will not recur, and patient may receive same antibiotic again if needed
Anaphylaxis

• Immediate allergic reaction
  • Within few hours of antibiotic administration
• Presents with laryngeal edema, facial swelling, urticaria, wheezing/shortness of breath, hypotension
• Can be predicted by skin tests
  • If skin test is negative, the patient is not at risk for anaphylaxis
• People can overcome this type of allergy over time
  • 80% of patients will no longer be allergic after 10 years, so it is important to have an evaluation by Allergy to determine status
Late Severe Reactions Involving The Skin

- Includes: Stevens-Johnson syndrome (SJS), Toxic Epidermal Necrolysis (TEN), Drug Rash with Eosinophilia and Systemic Symptoms (DRESS)

- SJS/TEN: Exfoliative (skin peeling) dermatitis with mucous membrane involvement (mouth, eyes, genitals) usually occurring after a patient has been on antibiotics for ~7 days

- DRESS: Fever, rash, eosinophilia that develops 2-6 weeks into an antibiotic course

- Not predicted by skin tests

- Patients are ill and require hospitalization
Other Severe Reactions

- Inflammation of the liver, kidneys or lungs (hepatitis/nephritis/pneumonitis)
- Hemolytic anemia/cytopenias
- Tendon rupture
Key Elements For Accurate Documentation Of PCN Allergy

- **Document precise reaction** (e.g., if the reaction was a rash, distinguish hives from maculopapular rash from late blistering rash with lesions in the mouth)
- **Document when the reaction occurred**
  - Age of patient at time of reaction
  - Timing of reaction in relation to antibiotic administration (e.g., within 3 hours vs. after 72 hours of antibiotic administration)
- **Ask the patient and/or check in the electronic health record what antibiotics** the patient has received since the reported reaction, and document this
Does My Patient Have a Penicillin (PCN) Allergy?

**Developed by The Johns Hopkins Hospital Department of Antimicrobial Stewardship**

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**Have you ever had a reaction to PCN or PCN derivatives (e.g., amoxicillin, ampicillin, amoxicillin-clavulanate)?**

**YES**

Did the reaction involve at least two of the following within 24 hours of first dose of antibiotic?
- Face swelling (throat, tongue, lips, eyes bilaterally)
- Wheezing and/or severe difficulty breathing
- Urticaria (hives): Raised itchy bumps (red or skin-colored); the center of a red hive turns white upon pressure
- Low blood pressure

**NO/UNKNOWN**

Did you have a PCN skin test or a PCN/amoxicillin challenge, and were you told you were no longer allergic?

**YES**

Remove/do not enter PCN allergy or communicate with prescriber

**NO**

Did you have a PCN skin test or a PCN/amoxicillin challenge, and were you told you were no longer allergic?

**YES**

Document patient reports anaphylaxis, not confirmed (if applicable), communicate to prescriber

**NO**

Does not recall the reaction

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Other reactions

- Rash described as peeling/blistering AND associated with inflammation/blistering in the mouth, eyes or genitals

**YES**

Document Stevens-Johnson-like syndrome

**NO**

- Isolated nausea, vomiting, diarrhea, headaches, dizziness or fatigue

**YES**

Remove/do not enter PCN allergy or communicate with prescriber

**NO**

- Maculopapular rash that appeared ≥ 2 days after antibiotic administration

**YES**

Document non-urticarial rash

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Other reactions

- Reaction was a non-urticarial rash, document non-urticarial rash

**NO**

- Reaction was hives, document hives

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Have you taken amoxicillin or amoxicillin-clavulanate (augmentin)? If patient unsure, search in EMR for prior treatment.

**YES**

- No reaction occurred, remove/do not enter allergy or communicate with prescriber

**NO**

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- Have you taken cephalixin (keflex), cefuroxime (ceftin), or cefazolin? If patient unsure, search in EMR for prior treatment.

**YES**

- No reaction occurred, document historical reaction to PCN, patient able to take cephalosporins, and document any cephalosporins given

**NO**

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Request Allergy & Immunology Consult if antibiotic needed

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References

• Blumenthal et al. The Impact of a Reported Penicillin Allergy on Surgical Site Infection Risk. CID 2018 Jan 18;66(3).


