

AHRQ Safety Program for Telemedicine: Improving Antibiotic Use

Best Practices in Management of Patients With Antibiotic Allergies Over Telemedicine



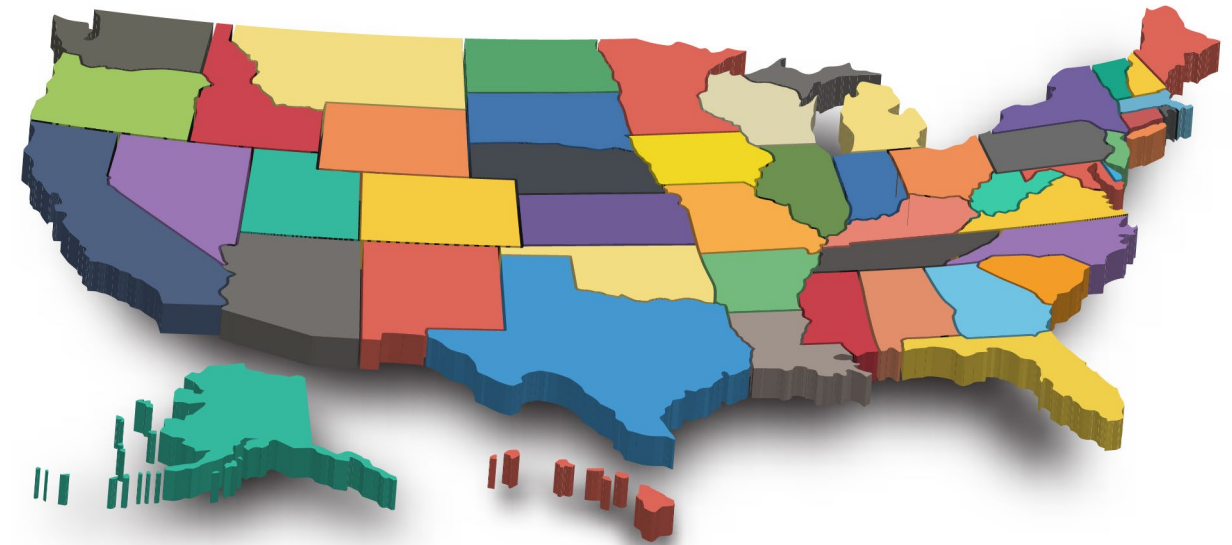
Objectives

By the end of this presentation, participants will be able to—

- Explain the importance of clarifying antibiotic allergies before prescribing antibiotics over telemedicine
- Recognize types of reactions to commonly-prescribed antibiotics
- Review cross-reactivity between antibiotic classes
- Describe approaches to evaluating adults and children with reported antibiotic allergies

Antibiotic Allergy Prevalence¹⁻⁵

- 10 percent of U.S. population report a history of a penicillin allergy
- 95 percent of patients with a reported penicillin “allergy” can tolerate penicillins
- Among patients with an IgE-mediated penicillin allergy, 80 percent will no longer have a reaction to penicillins after 10 years



Why Are Antibiotic Allergies Overdiagnosed?^{1-4,6}

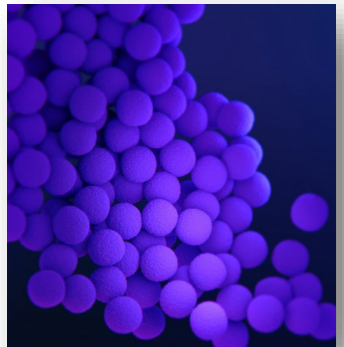
- Timing of a viral exanthem when a patient is inappropriately given antibiotics for a viral infection
- Nonimmunologic side effects (e.g., diarrhea, nausea) are recorded as allergies
- Patients can't recall the allergy
- Patient's family members may have an allergy

Why Should We Assess Antibiotic Allergies? 1⁵⁻¹¹

- Patients reporting antibiotic allergies are more likely to get an alternative, broader spectrum antibiotic
- Alternatives may—
 - Be less effective
 - Have more side effects
 - Cost more
 - Be associated with acquisition of resistant organisms

Why Should We Assess Antibiotic Allergies? 2⁶⁻¹²

- Increased odds of *Clostridioides difficile* infection
- Increased odds of methicillin-resistant *Staphylococcus aureus* colonization
- Increased odds of vancomycin-resistant *Enterococcus* colonization
- Patients with penicillin allergies are more likely to receive second-line surgical site infection prophylaxis
 - 50 percent more likely to get a surgical site infection



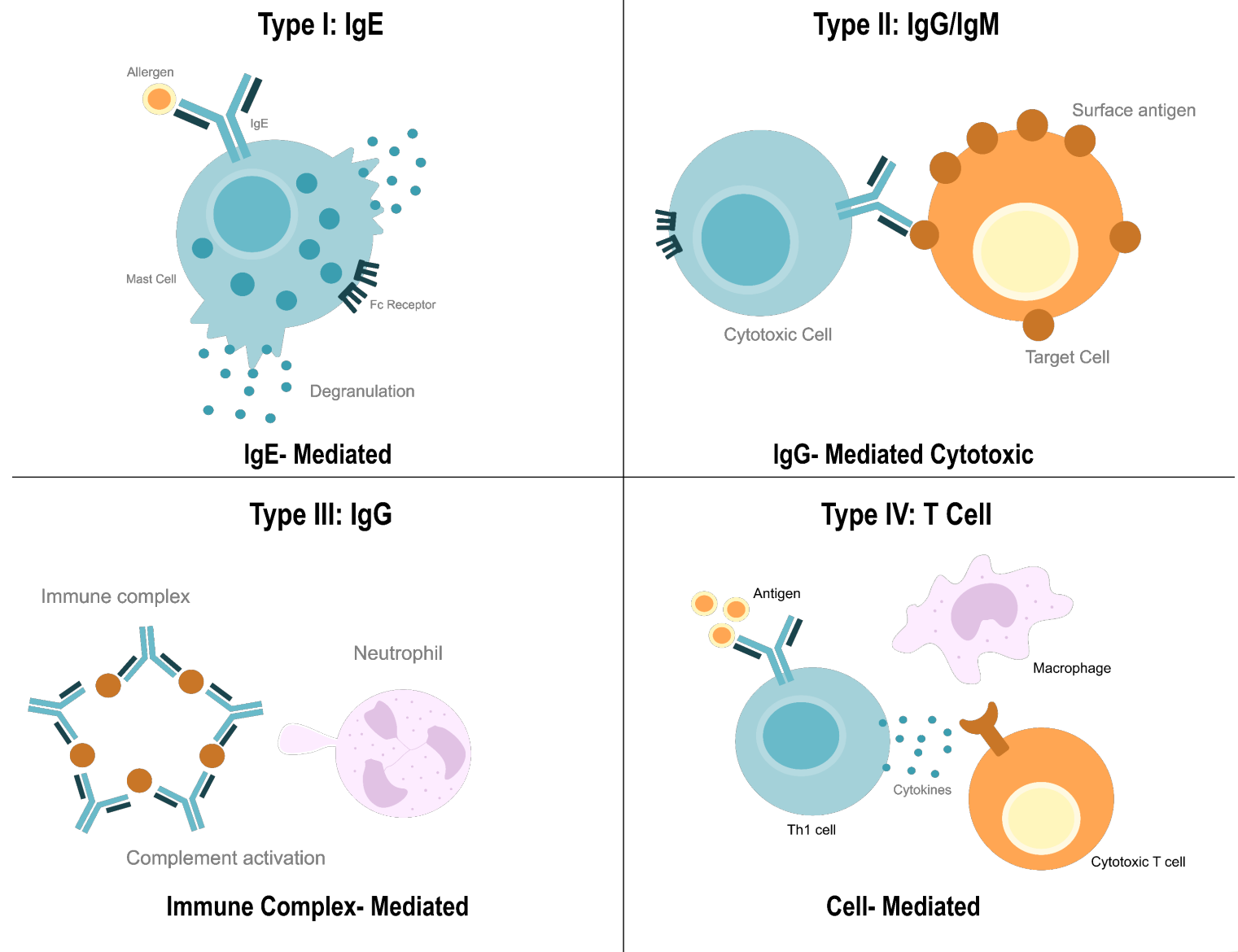
Intolerance Versus Allergy^{6,13}

- If the patient notes an intolerance, document as intolerance (not allergy)
- Will probably tolerate similar antibiotics
- May tolerate that antibiotic if provided in a different way (such as with food)



Types of Allergic Reactions¹⁴⁻¹⁵

- Type 1
 - IgE-mediated
- Type 2
 - Antibody-mediated cytotoxic
- Type 3
 - Immune complex-mediated
- Type 4
 - T-cell mediated



Type 1 Reactions^{6,14-15}

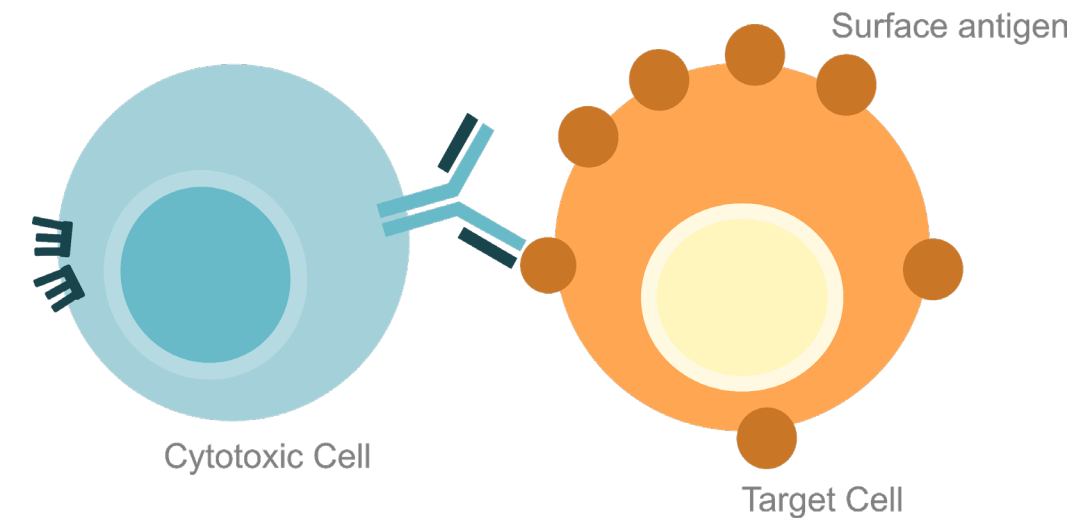
- IgE-mediated hypersensitivity reactions
 - Urticaria (hives)
 - Angioedema
 - Anaphylaxis
- Penicillins are the most common



Type 2 Reactions^{6,14}

- Antibody-mediated destruction of white blood cells, red blood cells, or platelets
- Relatively uncommon
- Penicillins and cephalosporins are the most common

Type II : IgG/IgM

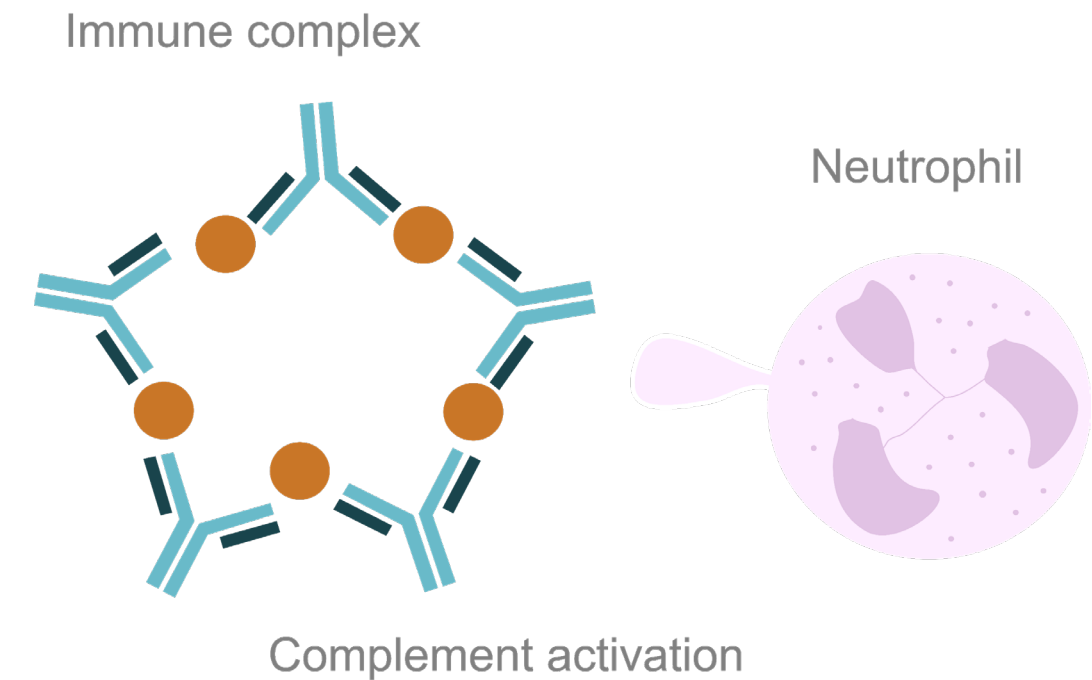


IgG-Mediated Cytotoxic

Type 3 Reactions^{6,14}

- IgG-immune complex deposition
 - Complement activation
 - Serum sickness or vasculitis
 - Palpable purpura, joint pain, lymphadenopathy, urticaria
- Relatively uncommon

Type III : IgG



Immune Complex- Mediated

Type 4 Reactions^{6,14-15}

- Activation of T-cells
- Mild reactions: maculopapular rashes
 - Common
 - Can be misidentified as hives
- Severe reactions: Stevens-Johnson syndrome, toxic epidermal necrolysis, DRESS
- Penicillins, trimethoprim-sulfamethoxazole



Taking an Allergy History⁵

- Is this an allergy or a side effect?
 - Side effect examples: nausea, vomiting, diarrhea, headaches, dizziness, fatigue, taste alterations
- Is there a plan to prevent side effects?
 - Prescribe antiemetics?
 - Take certain antibiotics with food?



Allergy History: Timing of Reaction⁵⁻⁶

- How long after starting antibiotics did the reaction occur?
 - Sudden reaction (minutes to hours): more likely Type 1
- How long ago did the reaction occur?
- IgE-mediated hypersensitivity reactions decrease over time
 - 50 percent lose hypersensitivity after 5 years
 - 80 percent lose hypersensitivity after 10 years

Allergy History: Describing the Rash⁵⁻⁶

- Hives: red, raised, smooth, itchy bumps
 - Can look like mosquito bites
 - Often have white centers
- Mild type 4 rashes: maculopapular or morbilliform
- Blistering rash, rash with skin peeling, or mucosal membranes: Stevens-Johnson-like syndrome or toxic epidermal necrolysis



Type 1 IgE-Mediated Reaction History⁵⁻⁶

- Ask if the patient had—
 - Swelling of throat, tongue, lips, or eyes
 - Wheezing or trouble breathing
 - Low blood pressure
 - Hives



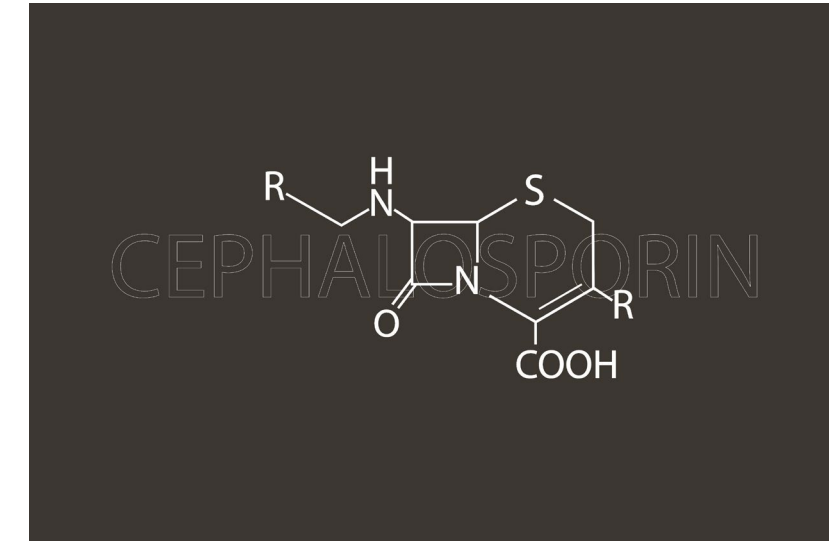
Allergy History: Alternative Causes⁵⁻⁶

- Other medications?
- Other illnesses (such as viruses)?
- Environmental or seasonal allergies?



Allergy History: More Recent Exposures

- Have they received the same antibiotic since?
- For penicillin allergies, have they received other medications in the same class?
 - Have they received cephalosporins?
 - Patients with reactions to cephalosporins often react just to the side chain
 - Could tolerate cephalosporins with dissimilar side chains
- What happened after that exposure?
- Has an allergist ever assessed them?



Documentation^{5-6,13,16}

- Clinicians should document all this information in the chart
- If you have determined the patient actually has an intolerance, remove the allergy from the chart
 - Tell the patient or family that you are removing the allergy and why



How To Manage Patients With Allergies⁶

- Nonsevere penicillin allergy: rechallenge with a different beta-lactam (such as a cephalosporin)
 - For patients with anaphylaxis to penicillin, you may be able to use a cephalosporin
- Allergy referral is an option

How To Manage Patients With Severe Allergies⁶

- Refer to an allergist for evaluation prior to penicillin prescription if—
 - Type 1, IgE-mediated anaphylactic reaction
 - Type 2 or 3 reaction
 - Severe type 4 reaction (such as Stevens-Johnson syndrome, toxic epidermal necrolysis, or DRESS)
- Penicillin skin testing is helpful for ruling out type 1 reactions



After a Skin Test^{6,17-18}

- Rate of developing reaction to penicillin if there is a negative skin test is negligible



Cephalosporin Allergies^{6,13}

- 0.5–2 percent of U.S. population have cephalosporin allergies recorded in the chart
- Allergies to cephalosporins are often to a distinct side chain
- Patients can often tolerate cephalosporins with different side chains
- If there is a nonanaphylactic cephalosporin allergy, provide the patient with a cephalosporin with a dissimilar side chain
- If there is a history of anaphylaxis to a cephalosporin, consider referring to an allergist

Cephalosporins and Penicillins^{6,19-22}

- Cross reactivity 2–5 percent in skin test-proven penicillin allergies
- Penicillin allergy in the chart and unclear if patient is allergic: likelihood of reacting to cephalosporin is <1 percent
- Nonanaphylactic cephalosporin allergy: can tolerate penicillins
- Anaphylaxis to cephalosporin: talk to allergist before prescribing penicillin

Trimethoprim-Sulfamethoxazole (TMP/SMX)²³

- Second most likely antibiotic to cause a reaction
- Four percent of U.S. population with trimethoprim-sulfamethoxazole allergies
- Most common reaction: maculopapular rash days to weeks into therapy
- Rash and new fever: can have multisystem organ involvement
 - Stop trimethoprim-sulfamethoxazole if the rash is more than mild or the patient has fevers unrelated to the infection
- Other possible reactions: serum sickness, hemolytic anemia, blistering reactions
- IgE-mediated reactions less common

Tetracyclines²³

- Often cause photosensitivity (not an allergy)
 - Distinguish photosensitivity from other types of rashes
 - Counsel about precautions in sunlight
- IgE-mediated reactions are rare

Case 1: 50-Year-Old Establishing Care

- First visit over telemedicine
- 50-year-old who reports past medical history of depression
- On his intake form he noted a penicillin allergy



Case 1: What Was the Reaction?

- “I had horrible diarrhea when I took amoxicillin-clavulanate as a child”



Case 1: Conclusion

- Diarrhea is an intolerance, not an allergy
- Can likely tolerate amoxicillin-clavulanate
- Guidance on taking medications with food or taking precautions to prevent diarrhea
- Inform the patient he does not have a penicillin allergy
- Remove penicillin allergy from his record

Case 2: The Same 50-Year-Old Patient

- “I had a rash when I was given amoxicillin as a child for a throat infection.”



Case 2: More Details

- What did the rash look like?
- How long after starting antibiotics did you get the rash?
- Was he diagnosed with hives?
- Has he taken other antibiotics since (especially amoxicillin, amoxicillin-clavulanate, or cephalosporins)? Was there a reaction?

Case 2: Conclusion

- What did the rash look like?
 - A few red bumps on his chest
- How long after starting antibiotics did he get the rash?
 - 8 days after starting the antibiotic
- Was he diagnosed with hives?
 - No
- Has he taken other antibiotics since (especially amoxicillin, amoxicillin-clavulanate, or cephalosporins)? Was there a reaction?
 - Amoxicillin for a tooth infection: no problems
- Given time since the reaction, the type of the reaction, and tolerance of the antibiotic, he likely is no longer allergic to amoxicillin

Take-Home Messages

- ✓ Appropriate documentation of antibiotic allergies is important in improving antibiotic prescribing and patient outcomes
- ✓ Requires a good history of the reaction
- ✓ Ensure that the medical record reflects your findings, and inform the patient and families
- ✓ Some cases may require referrals to allergists

Disclaimer

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