

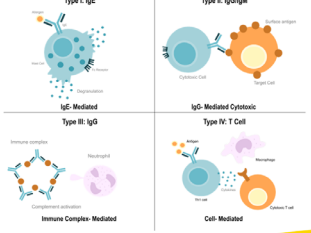
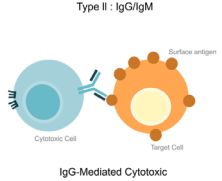
Best Practices in Management of Patients With Antibiotic Allergies Over Telemedicine

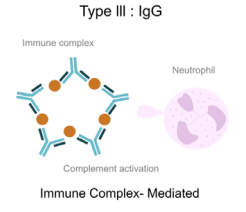
Slide Title and Commentary	Slide Number and Slide
Best Practices in Management of Patients With Antibiotic Allergies Over Telemedicine SAY: Welcome to the presentation titled, “Best Practices in Management of Patients With Antibiotic Allergies Over Telemedicine.”	Slide 1 AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Best Practices in Management of Patients With Antibiotic Allergies Over Telemedicine  AHRQ Pub. No. 20/27-0021 October 2020
Objectives SAY: This presentation will be using a clinical case–based format. The objectives of this presentation are to— • Explain the importance of clarifying antibiotic allergies before prescribing antibiotics to children and adults 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	Slide 2 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 AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 2

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Antibiotic Allergy Prevalence SAY: This presentation will primarily address allergies to beta-lactam antibiotics, a class of antibiotics that includes penicillins, cephalosporins, aztreonam, and carbapenems. In particular, it will focus on antibiotics in the penicillin class such as penicillin, amoxicillin, and amoxicillin-clavulanate, because these are the most common antibiotics to which allergies are reported; 10 percent of the U.S. population report penicillin allergies. In this presentation, “penicillin” allergies refer to all drugs in the penicillin class unless otherwise noted. However, about 95 percent of people who report a penicillin allergy can safely tolerate penicillin antibiotics. Even among patients with an IgE-mediated penicillin allergy, about 80 percent will no longer have a reaction to penicillins after 10 years.	Slide 3 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  AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 3

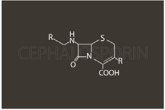
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Why Are Antibiotic Allergies Overdiagnosed? SAY: There are several reasons for the overdiagnosis of antibiotic allergies. Viral exanthems often appear during the same period that antibiotics are mistakenly prescribed for a viral infection. Thus, a rash associated with a viral infection may be incorrectly ascribed to the antibiotic. This can be avoided by not prescribing antibiotics for upper respiratory tract infections or other viral infections. Additionally, nonimmunologic side effects such as nausea or diarrhea are often inaccurately identified as allergies. Intolerances to medications are often inaccurately recorded in the allergy section of the medical record, leading to avoidance of certain classes of antibiotics. Patients often are unable to recall the specific symptoms that led to the diagnosis of the penicillin allergy, particularly for adult patients when the reaction occurred in childhood. However, once such a diagnosis is made, it is often perpetuated in the patient's medical record without additional clarifying information. Another cause of incorrect penicillin allergy labels occurs when other family members report antibiotic allergies, and these family members tell the patient that they may have an allergy, too. However, antibiotic allergies do not follow a clear inheritance pattern. A family history alone should not lead to avoidance of beta-lactam antibiotics or other classes of antibiotics.	Slide 4 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 AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 4
Why Should We Assess Antibiotic Allergies? 1 SAY: Correct assessment of antibiotic allergies is important because when a patient reports an allergy to penicillin or another beta-lactam antibiotic, they are more likely to get an alternative, broader spectrum antibiotic. These alternatives are often less effective, lead to more side effects, are more expensive, and may be associated with future colonization or infection with antibiotic-resistant organisms.	Slide 5 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 AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 5

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Why Should We Assess Antibiotic Allergies? 2 SAY: Patients with penicillin allergies documented in their medical charts have increased odds of <i>Clostridioides difficile</i> infections, methicillin-resistant <i>Staphylococcus aureus</i> colonization, and vancomycin-resistant <i>Enterococcus</i> colonization. This may be related to receipt of suboptimal antibiotic therapy that increases the risk of infection or colonization with these organisms. Another study examined the impact of having a documented penicillin allergy in a patient's chart, such as that assessed during a preoperative examination, on surgical outcomes. On closer investigation, 9 percent of reactions were intolerances, such as nausea or vomiting. Patients who reported a penicillin allergy and went on to receive second-line perioperative antibiotic prophylaxis as a result were 50 percent more likely to develop a surgical site infection. Because of the adverse consequences associated with incorrect penicillin allergy documentation, the Centers for Disease Control and Prevention has recommended that verifying antibiotic allergies be part of antibiotic stewardship activities, and the Joint Task Force for Allergy and Immunology Practice Parameters give a strong recommendation to remove penicillin allergy labels after an assessment whenever appropriate, which they call delabeling.	Slide 6 Why Should We Assess Antibiotic Allergies? 2⁶⁻¹² - Increased odds of <i>Clostridioides difficile</i> infection - Increased odds of methicillin-resistant <i>Staphylococcus aureus</i> colonization - Increased odds of vancomycin-resistant <i>Enterococcus</i> 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   AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 6
Intolerance Versus Allergy SAY: If someone tells you over telemedicine that they had an intolerance to an antibiotic, document that it is an intolerance and not an allergy, because it is likely that the patient will tolerate other medications in the same class, and maybe even the same antibiotic if taken in a different way, such as with food. The Joint Task Force for Allergy and Immunology Practice Parameters recommends that patients with a penicillin allergy label in their chart but a history inconsistent with a penicillin allergy can take penicillins.	Slide 7 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)  AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 7

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Types of Allergic Reactions SAY: It is helpful to review the different types of drug allergies to facilitate correct classification of antibiotic reactions that patients report over telemedicine. A drug allergy is an immunologically mediated response to a pharmaceutical agent in a sensitized person. There are four main types, conveniently arranged from type 1 to type 4.	Slide 8 Types of Allergic Reactions¹⁴⁻¹⁵ - Type 1 - IgE-mediated - Type 2 - Antibody-mediated cytotoxic - Type 3 - Immune complex-mediated - Type 4 - T-cell mediated  AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 8
Type 1 Reactions SAY: Type 1 reactions are IgE-mediated hypersensitivity reactions. They generally manifest as urticaria, which are irregular, pruritic papules that develop rapidly, also known as hives. They can also manifest as angioedema, which is characterized by swelling of the face, extremities, or airways, and can lead to bronchospasm. Type 1 reactions include anaphylaxis, which is characterized by the rapid onset of urticaria as well as respiratory failure and hypotension. They occur within minutes to hours of receipt of an antibiotic. In most cases, patients who develop type 1 reactions to antibiotics like penicillin have had prior exposure to the agent causing the reaction, which has led to sensitization. Among antibiotic classes, penicillin agents are most commonly associated with these reactions.	Slide 9 Type 1 Reactions^{6,14-15} - IgE-mediated hypersensitivity reactions - Urticaria (hives) - Angioedema - Anaphylaxis - Penicillins are the most common  AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 9
Type 2 Reactions SAY: Type 2 reactions to antibiotics involve antibody-mediated destruction of white blood cells, red blood cells, or platelets. Hematologic abnormalities most often are detected on routine blood testing, although some patients with this type of reaction may have signs of hemolysis such as jaundice or dark urine, or signs of thrombocytopenia such as petechiae. Type 2 reactions can occur soon after antibiotics are started, but also during subsequent days and weeks of antibiotic therapy. Penicillins and cephalosporins are the most implicated classes causing type 2 reactions. Type 2 reactions are relatively uncommon.	Slide 10 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  AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 10

Slide Title and Commentary	Slide Number and Slide
Type 3 Reactions SAY: Type 3 reactions to antibiotics involve IgG-immune complex deposition and complement activation. They generally manifest as serum sickness or vasculitis and present with palpable purpura, joint pain, urticaria, lymphadenopathy, and fevers. They occur after a patient had been on antibiotics for several days. Type 3 reactions to antibiotics that present as fevers can be particularly confusing because they may be difficult to distinguish from a worsening infection. Type 3 reactions are relatively uncommon.	Slide 11 Type 3 Reactions^{6,14} • IgG-immune complex deposition ◦ Complement activation ◦ Serum sickness or vasculitis • Palpable purpura, joint pain, lymphadenopathy, urticaria • Relatively uncommon  AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 11
Type 4 Reactions SAY: Finally, type 4 reactions to antibiotics result from the activation of T-cells. They can range from relatively mild reactions such as maculopapular rashes to severe reactions such as Stevens-Johnson syndrome, toxic epidermal necrolysis, or DRESS syndrome, an abbreviation that stands for “drug reaction with eosinophilia and systemic symptoms.” They also tend to occur after a patient has been on antibiotics for several days. Of type 4 reactions to antibiotics, nonsevere reactions such as a maculopapular rash are the most common. Many antibiotics can cause type 4 reactions, including penicillins and trimethoprim-sulfamethoxazole.	Slide 12 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  AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 12
Taking an Allergy History SAY: Obtaining a brief, focused history can be very helpful in understanding the type of reaction a patient has had. This can easily be done over telemedicine. First, determine whether the reaction reported is an allergy. As noted previously, side effects such as nausea, vomiting, diarrhea, headaches, dizziness, fatigue, and taste alterations are common and upsetting to patients but are not true allergies. It is, however, important to know about side effects because if the patient needs to receive the same agent again, you can take steps to mitigate the side effects such as prescribing antiemetics for nausea or providing guidance such as taking certain antibiotics with food.	Slide 13 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?  AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 13

Slide Title and Commentary	Slide Number and Slide
Allergy History: Timing of Reaction SAY: If the patient reports an allergy, ask how long after they started the antibiotic the reaction occurred. Remember, type 1 reactions usually happen soon after the first dose of antibiotics, whereas other reactions usually occur after several days of therapy. If the reaction was sudden, it is more likely to be a type 1 reaction. Also, ask how long ago the reaction occurred. IgE-mediated penicillin hypersensitivity decreases with time with 50 percent of skin-test–positive patients losing their hypersensitivity by 5 years and 80 percent by 10 years.	Slide 14 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 AHRQ Safety Program for Telemedicine: Improving Antibiotic Use  Antibiotic Allergies 14
Allergy History: Describing the Rash SAY: If the patient reports a rash, ask the patient to describe the rash. Hives are red, raised, smooth, itchy bumps often with white centers that can be different sizes. They may look like fresh mosquito bites. Type 4 rashes are red, minimally raised and rough to the touch, like fine-grit sandpaper. Clinicians often describe type 4 rashes as maculopapular or morbilliform. Rashes that were blistering or led to skin peeling and/or involved mucous membranes suggest a Stevens-Johnson-like syndrome or toxic epidermal necrolysis. Ask how severe the rash was, including whether it resolved on its own or required medical attention. The severity of the rash should weigh into the decision about whether to rechallenge a patient with a particular antibiotic.	Slide 15 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 AHRQ Safety Program for Telemedicine: Improving Antibiotic Use  Antibiotic Allergies 15
Type 1 IgE-Mediated Reaction History SAY: Ask if the patient had swelling of the throat, tongue, lips, or eyes; wheezing or trouble breathing; low blood pressure; or hives. These are all symptoms and signs of a type 1 reaction.	Slide 16 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 AHRQ Safety Program for Telemedicine: Improving Antibiotic Use  Antibiotic Allergies 16

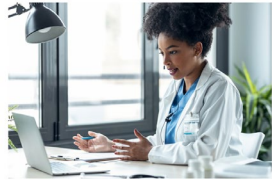
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Allergy History: Alternative Causes SAY: Ask if the patient was on other medications at the time of the reaction. This helps to ascertain whether a different medication may have caused the reaction. Ask if the patient was undergoing treatment for other medical conditions at the time of diagnosis which could account for the symptoms. Also ask if the patient could have been suffering from environmental or seasonal allergies at the time.	Slide 17 Allergy History: Alternative Causes⁵⁻⁶ • Other medications? • Other illnesses (such as viruses)? • Environmental or seasonal allergies?  AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 17
Allergy History: More Recent Exposures SAY: Finally, determine if the patient has received the same medication or a different penicillin or cephalosporin since the reaction. Ask about specific brand names of antibiotics that the patient may be able to recognize. If the patient has received another penicillin or cephalosporin, ask what happened after exposure to these other beta-lactams. Often patients will have taken and tolerated other beta-lactam antibiotics besides the one they report an allergy to, which generally indicates that they can tolerate alternative beta-lactams. For example, immediate allergic reactions to cephalosporins are usually related to the side chain rather than the core beta-lactam portion of the molecule, so patients with a non-anaphylactic cephalosporin allergy often can tolerate other cephalosporins with dissimilar side chains. Also, ask if the patient has ever seen an allergist or undergone skin testing to further assess existing allergies.	Slide 18 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?  AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 18

Slide Title and Commentary	Slide Number and Slide
Documentation SAY: In taking an allergy history, clinicians should be as descriptive as possible and document their findings in a place in the chart where these details will be easily found. Document the specific allergy reported for each antibiotic and remove incorrect allergies such as hives if the patient clearly describes a rash that is inconsistent with hives. Also, note what antibiotics the patient has tolerated previously as well as any information regarding skin testing. If the patient has side effects that are mislabeled as allergies in the medical record, they should be removed as allergies and noted as side effects instead. Further, make sure your patient understands that the allergy label was removed or modified and why it was changed. If you have determined that the patient does not have a penicillin allergy, be sure to make the patients and their families aware that they are no longer allergic to penicillin and that they should update their other healthcare practitioners. In one study, 36 percent of hospitalized patients with negative penicillin skin testing and no evidence of an interval reaction had a penicillin allergy erroneously redocumented at a subsequent admission within 1 year.	Slide 19 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  AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 19
How To Manage Patients With Allergies SAY: The 2022 Practice Parameters from the American Academy of Allergy, Asthma, and Immunology provide updated guidance about the management of patients with beta-lactam allergies. In patients with nonsevere penicillin allergies, in general, rechallenge with an alternative beta-lactam is reasonable. Amoxicillin is the most likely beta-lactam antibiotic to cause a rash, and even with a history of an amoxicillin rash, most patients will not have a problem with other beta-lactam agents. You can also refer to an allergist for additional testing for the antibiotic in question. However, this evaluation may need to be in-person if specific tests, such as a skin test, are required. For patients with a history of allergy or even anaphylaxis to penicillin, a structurally dissimilar cephalosporin can be provided without any additional testing.	Slide 20 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 AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 20

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How To Manage Patient With Severe Allergies SAY: Patients with a history suggesting a type 2 or 3 reaction, a type 1, IgE-mediated anaphylactic reaction, or a severe type 4 reaction, such as Stevens-Johnson syndrome, toxic epidermal necrolysis, or DRESS syndrome, should not be rechallenged without input from an allergy specialist. For example, if you have a patient with a history of any anaphylaxis to penicillin or an IgE-mediated reaction to penicillin within the last 5 years in whom you are considering prescribing a penicillin, refer the patient to an allergist for further evaluation, particularly if the patient is likely to need antibiotics in the future such as for perioperative prophylaxis. The allergist may recommend penicillin skin testing, which is typically performed in an allergist's office where rescue medications are available in case someone has a serious reaction. A negative penicillin test is useful for ruling out a type 1 reaction but does not help with the diagnosis of non-type 1 reactions, including severe non-IgE-mediated reactions such as Stevens-Johnson syndrome or DRESS. Penicillin skin testing is highly predictive of serious anaphylactic reactions. In the United States, penicillin skin testing has a negative predictive value of about 98 percent for type 1 reactions.	Slide 21 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  AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 21
After a Skin Test SAY: The rate of developing a penicillin allergy in skin test-negative patients following up to three courses of penicillin has been shown to be negligible, indicating that patients cleared of penicillin allergies via negative skin test do not carry an increased future risk of allergy compared with the general population.	Slide 22 After a Skin Test^{6,17-18} Rate of developing reaction to penicillin if there is a negative skin test is negligible  AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 22

Slide Title and Commentary	Slide Number and Slide
Cephalosporin Allergies SAY: In general, fewer people react to cephalosporins than penicillins—approximately tenfold less. About 0.5 to 2 percent of U.S. patients have documented cephalosporin allergies. Often, the cephalosporin reactions are not to the beta-lactam ring itself that is shared with all beta-lactam antibiotics, but instead to one of the side chains of the chemical structure. Thus, patients who react to one cephalosporin often can tolerate other cephalosporins. For patients with nonanaphylactic cephalosporin allergies, providing the patient with a cephalosporin with a dissimilar side chain than the one to which they had a reaction is an option. For patients with a history of anaphylaxis to a cephalosporin in whom you are considering providing a cephalosporin with a nonidentical side chain, it would be a good idea to first refer to an allergist for further workup.	Slide 23 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 AHRQ Safety Program for Telemedicine: Improving Antibiotic Use 
Cephalosporins and Penicillins SAY: It was previously believed that the cross-reactivity between penicillins and cephalosporins was as high as 10 to 15 percent. More recent data indicate that this is no longer true. Now, if a patient has a positive penicillin skin test, he or she has only a 2 to 5 percent chance of having a type 1 reaction to a cephalosporin. If there is a penicillin allergy listed in the chart and it is unclear if the patient is allergic, the likelihood of the patient reacting to a cephalosporin is quite low, well under 1 percent, and similar to that of the general population. Therefore, a patient with an unclear penicillin allergy can receive a cephalosporin. Similarly, for patients with a nonanaphylactic cephalosporin allergy, a penicillin could be provided without any additional testing. However, for patients with a history of anaphylaxis to a cephalosporin to whom you are considering prescribing a penicillin, it is a good idea to refer to an allergist first.	Slide 24 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 AHRQ Safety Program for Telemedicine: Improving Antibiotic Use 

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Trimethoprim-Sulfamethoxazole (TMP/SMX) SAY: It is important to also consider reactions to non-beta-lactam antibiotics. Trimethoprim-sulfamethoxazole is the second most frequent cause of antibiotic allergies after amoxicillin. Up to 4 percent of patients will react to this antibiotic. The most common reaction to trimethoprim-sulfamethoxazole is a maculopapular rash. It can occur days to weeks into therapy and can vary in severity. Patients with a rash and a new fever are at risk for progression to multisystem organ involvement; thus, the medication should be stopped if the rash is more than mild or the patient has fevers not related to underlying infection. Other less common reactions include serum sickness, hemolytic anemia, hepatitis, aseptic meningitis, blistering reactions such as Stevens-Johnson syndrome, toxic epidermal necrolysis, or erythema multiforme. IgE-mediated reactions are uncommon.	Slide 25 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 AHRQ Safety Program for Telemedicine: Improving Antibiotic Use  Antibiotic Allergies 25
Tetracyclines SAY: Tetracyclines, which include tetracycline, doxycycline, and minocycline, frequently cause photosensitivity leading to sunburn. This is not a drug allergy. It is important to counsel patients taking tetracycline antibiotics about sun exposure, and to make recommendations such as wearing sunscreen or covering up with hats and long-sleeve shirts and pants. If someone reports a rash to a tetracycline, ask if it was only on sun-exposed parts of the skin. IgE-mediated reactions to tetracyclines, like to other non-beta-lactam antibiotics, are rare.	Slide 26 Tetracyclines²³ • Often cause photosensitivity (not an allergy) ◦ Distinguish photosensitivity from other types of rashes ◦ Counsel about precautions in sunlight • IgE-mediated reactions are rare AHRQ Safety Program for Telemedicine: Improving Antibiotic Use  Antibiotic Allergies 26

Slide Title and Commentary	Slide Number and Slide
Case 1: 50-Year-Old Patient Establishing Care SAY: Let's go through an example. You are seeing a 50-year-old man with a past medical history of depression over telemedicine. He filled out an intake form prior to starting the visit where he noted that he had a penicillin allergy. There are no other details on the intake form. What should you do next?	Slide 27 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  AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 27
Case 1: What Was the Reaction? SAY: You should ask him about his allergy history. Suppose he says, "I had horrible diarrhea when I took amoxicillin-clavulanate for sinusitis when I was a teenager." What should you do?	Slide 28 Case 1: What Was the Reaction? • "I had horrible diarrhea when I took amoxicillin-clavulanate as a child"  AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 28
Case 1: Conclusion SAY: Diarrhea is a frequent side effect of amoxicillin-clavulanate but is not an allergy. Most patients who have had diarrhea in the past with amoxicillin-clavulanate will tolerate not only other penicillins, but amoxicillin-clavulanate as well, especially if the patient takes probiotics or eats foods containing probiotics such as yogurt. You should remove the penicillin allergy from the chart and explain to him that he does not have an allergy.	Slide 29 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 AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 29
Case 2: The Same 50-Year-Old Patient SAY: Suppose you asked that same 50-year-old patient about his allergy and he said, "I had a rash when I was given amoxicillin as a child for a throat infection." What should you do?	Slide 30 Case 2: The Same 50-Year-Old Patient • "I had a rash when I was given amoxicillin as a child for a throat infection."  AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 30

Slide Title and Commentary	Slide Number and Slide
Case 2: More Details SAY: You need more information. It is possible that he had a virus, and the rash was a viral exanthem. If he can remember the details, ask him to describe what the rash looked like, how often after the first dose of antibiotics it occurred, and whether he was diagnosed with hives at the time. Ask if he has taken other antibiotics, particularly amoxicillin, amoxicillin/clavulanate, or cephalosporins, and if he had a reaction.	Slide 31 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? AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 31
Case 2: Conclusion SAY: When asked what the rash looked like, he remembers it being a few red bumps on his chest. When asked how long after starting antibiotics the rash appeared, he notes that it started 8 days after starting the antibiotic. When asked if he was diagnosed with hives, he says no. While it is possible that this is a type 4 infection, it could also be a viral exanthem. It is unlikely to be a Type 1 infection. When asked if he had taken other antibiotics since, especially amoxicillin, amoxicillin-clavulanate, or cephalosporins, and whether he had reacted to these, he notes that he took amoxicillin for a tooth infection 10 years ago and had no issues. Given the time since the reaction, the type of the reaction, and his history of now tolerating amoxicillin, it is unlikely that he has an amoxicillin allergy. Document what antibiotics he has reacted to and the type of reaction as well as antibiotics he has tolerated in his chart. If he has an infection that requires beta-lactam antibiotics and has tolerated a beta-lactam agent before, a new course is unlikely to cause a reaction, and he can be considered for treatment.	Slide 32 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 AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 32

Slide Title and Commentary	Slide Number and Slide
Take-Home Messages SAY: In conclusion, ensuring appropriate documentation of antibiotic allergies is an important part of antibiotic stewardship, and may improve patient outcomes. Take a good history about the type of antibiotic allergy, modify the medical record as needed, and ensure that the patient understands the importance of correctly describing the reaction at future visits to other clinicians. Patients are likely to need antibiotics again, so consider referring patients to an allergist if anaphylaxis has occurred. There are additional resources that you can review about how you and your practice will manage patients with reported antibiotic allergies such as the one-page summaries on antibiotic allergies intended for clinicians and healthcare workers, the sample patient portal scripts for communicating with patients efficiently about antibiotic allergies, and the patient and family education materials.	Slide 33 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 AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 33
Disclaimer SAY: Please review this disclaimer.	Slide 34 Disclaimer • The findings and recommendations in this presentation are those of the authors, who are responsible for its content, and do not necessarily represent the views of AHRQ. No statement in this presentation should be construed as an official position of AHRQ or of the U.S. Department of Health and Human Services. • Participants have an implied responsibility to use the newly acquired information to enhance patient outcomes and their own professional development. The information presented in this activity is not meant to serve as a guideline for patient management. Any procedures, medications, or other courses of diagnosis or treatment discussed or suggested in this activity should not be used by clinicians without evaluation of their patient's conditions and possible contraindications and/or dangers in use, review of any applicable manufacturer's product information, and comparison with recommendations of other authorities. AHRQ Safety Program for Telemedicine: Improving Antibiotic Use Antibiotic Allergies 34
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Slide Title and Commentary	Slide Number and Slide
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