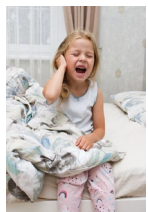
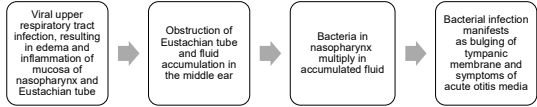
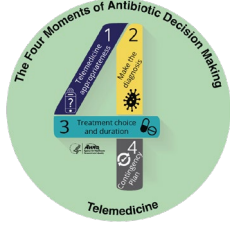


## Best Practices in Managing Acute Otitis Media in Children Over Telemedicine

| Slide Title and Commentary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Slide Number and Slide                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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| <p><b>Best Practices in Managing Acute Otitis Media in Children Over Telemedicine</b></p> <p>SAY:</p> <p>Welcome to the presentation titled, “Best Practices in Managing Acute Otitis Media in Children Over Telemedicine.”</p>                                                                                                                                                                                                                                                                                                                             | <p><b>Slide 1</b></p> <p><b>AHRQ Safety Program for Telemedicine:<br/>Improving Antibiotic Use</b></p> <p><b>Best Practices in Managing Acute<br/>Otitis Media in Children Over<br/>Telemedicine</b></p>                                                                                                                                                                                                                                                                                                                                                                                          |
| <p><b>Objectives</b></p> <p>SAY:</p> <p>This presentation will use a clinical case–based format to discuss the approach to managing acute otitis media. By the end of this presentation, participants will be able to—</p> <ul style="list-style-type: none"><li>• Describe how to manage acute otitis media in a child over telemedicine.</li><li>• Understand when a child with potential acute otitis media may need to be examined in person.</li><li>• Discuss the role of antibiotics and other therapeutic options for acute otitis media.</li></ul> | <p><b>Slide 2</b></p> <p><b>Objectives</b></p> <p>By the end of this presentation, participants will be able to—</p> <ul style="list-style-type: none"><li>• Describe how to manage acute otitis media in a child over telemedicine</li><li>• Understand when a child with potential acute otitis media may need to be examined in person</li><li>• Discuss the role of antibiotics and other therapeutic options for acute otitis media</li></ul>  <p><small>AHRQ Safety Program for Telemedicine: Improving Antibiotic Use</small></p> <p><small>Acute Otitis Media in Children 2</small></p> |

| Slide Title and Commentary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Slide Number and Slide                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| <p><b>Acute Otitis Media</b></p> <p>SAY:</p> <p>Most of the time when a caretaker is seeking medical assistance for a child with ear pain, they are concerned about acute otitis media.</p> <p>Acute otitis media is defined as moderate to severe bulging of the tympanic membrane or new-onset ear drainage, also known as otorrhea, with signs and symptoms of middle-ear inflammation such as ear pain and fever.</p> <p>The most common bacterial pathogen causing otitis media is nontypeable <i>Haemophilus influenzae</i>—that is, strains of <i>H. flu</i> not present in the standard childhood vaccine, which cause approximately 50 percent of cases of acute otitis media. The second and third most common bacterial pathogens are <i>Streptococcus pneumoniae</i> and <i>Moraxella catarrhalis</i>. These organisms cause approximately 25 percent and 15 percent of cases of otitis media, respectively.</p> <p>Even though rates of otitis media due to <i>pneumococcus</i> are declining in the setting of pneumococcal vaccination, therapy for otitis media primarily targets <i>Strep pneumoniae</i> as this organism is associated with higher morbidity and mortality compared to other organisms.</p> <p><i>Strep pneumoniae</i> is associated with greater clinical severity than other otopathogens, as reflected by higher fever curves, more intense ear pain, and a higher potential for complications such as bacteremia, meningitis, and mastoiditis.</p> | <p><b>Slide 3</b></p> <p><b>Acute Otitis Media</b></p> <ul style="list-style-type: none"> <li>Moderate to severe bulging of the tympanic membrane or new-onset ear drainage (i.e., otorrhea), usually with ear pain and fever<sup>1</sup></li> <li>Most common bacterial pathogens:<sup>2,3</sup> <ul style="list-style-type: none"> <li>Nontypeable <i>Haemophilus influenzae</i>: 50% cases</li> <li><i>Streptococcus pneumoniae</i>: 25%</li> <li><i>Moraxella catarrhalis</i>: 15%</li> </ul> </li> <li>Therapy primarily targets <i>S. pneumoniae</i> as it is associated with a greater likelihood of complications such as bacteremia, mastoiditis, and meningitis</li> </ul> <p>AHRQ Safety Program for Telemedicine: Improving Antibiotic Use</p> <p>Acute Otitis Media in Children 3</p> |

| Slide Title and Commentary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Slide Number and Slide                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| <p><b>Acute Otitis Media Pathophysiology</b></p> <p>SAY:</p> <p>Acute otitis media generally starts with a viral upper respiratory tract infection. This results in edema and inflammation of the mucosa of the nasopharynx and eustachian tube—the small passageway that connects the nasopharynx to the middle ear—leading to obstruction of the eustachian tube and accumulation of fluid in the middle ear.</p> <p>Bacteria that colonize the human nasopharynx such as <i>Strep pneumoniae</i> multiply in this fluid, leading to a bacterial infection that manifests as bulging of the tympanic membrane and the classic symptoms of acute otitis media.</p> <p>The increased prevalence of otitis media at younger ages is in part due to a shorter, more horizontal eustachian tube than in older children or adults, facilitating the accumulation of fluid.</p> | <p><b>Slide 4</b></p> <p><b>Acute Otitis Media Pathophysiology<sup>4,5</sup></b></p>  <pre> graph LR     A[Viral upper respiratory tract infection, resulting in edema and inflammation of mucosa of nasopharynx and Eustachian tube] --&gt; B[Obstruction of Eustachian tube and fluid accumulation in the middle ear]     B --&gt; C[Bacteria in nasopharynx multiply in accumulated fluid]     C --&gt; D[Bacterial infection manifests as bulging of tympanic membrane and symptoms of acute otitis media]   </pre> <ul style="list-style-type: none"> <li>Increased prevalence of otitis media at younger ages:       <ul style="list-style-type: none"> <li>Younger children have shorter and more horizontal eustachian tubes compared to older children and adults, facilitating fluid accumulation</li> </ul> </li> </ul> <p>AHRQ Safety Program for Telemedicine: Improving Antibiotic Use</p> <p>Acute Otitis Media in Children 4</p>                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <p><b>The Four Moments of Antibiotic Decision Making</b></p> <p>SAY:</p> <p>This presentation will review a clinical case using the Four Moments of Antibiotic Decision Making framework. Briefly, this framework consists of the following moments:</p> <p>Moment 1: Is my patient an appropriate candidate for a telemedicine visit?</p> <p>Moment 2: Does my patient have signs and symptoms indicating an infection that may require antibiotics? Is a diagnostic test needed?</p> <p>Moment 3: If antibiotics are indicated, what is the narrowest, safest, and shortest regimen I can prescribe?</p> <p>Moment 4: What symptomatic relief should I offer or prescribe to my patient? What should I tell my patient about the expected course and the followup plan?</p>                                                                                              | <p><b>Slide 5</b></p> <p><b>The Four Moments of Antibiotic Decision Making</b></p>  <pre> graph TD     subgraph "The Four Moments of Antibiotic Decision Making"         1[1. Is my patient an appropriate candidate for a telemedicine visit?]         2[2. Does my patient have signs and symptoms indicating an infection that may require antibiotics? Is a diagnostic test needed?]         3[3. If antibiotics are indicated, what is the narrowest, safest, and shortest regimen I can prescribe?]         4[4. What symptomatic relief should I offer or prescribe to my patient? What should I tell my patient about the expected course and the followup plan?]     end     1 --&gt; 2     2 --&gt; 3     3 --&gt; 4   </pre> <ol style="list-style-type: none"> <li>Is my patient an appropriate candidate for a telemedicine visit?</li> <li>Does my patient have signs and symptoms indicating an infection that may require antibiotics? Is a diagnostic test needed?</li> <li>If antibiotics are indicated, what is the narrowest, safest, and shortest regimen I can prescribe?</li> <li>What symptomatic relief should I offer or prescribe to my patient? What should I tell my patient about the expected course and the followup plan?</li> </ol> <p>AHRQ Safety Program for Telemedicine: Improving Antibiotic Use</p> <p>Acute Otitis Media in Children 5</p> |

| Slide Title and Commentary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Slide Number and Slide                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
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| <p><b>Case Presentation</b></p> <p>SAY:</p> <p>Let's discuss a case. You receive a triage form for your next patient: a 3-year-old boy. His mother notes that he has not been sleeping well over the past 2 days. It is stated that he is occasionally fussy during the day and says his right ear hurts. The form notes that his temperature at home is 100.9 degrees Fahrenheit and he feels warm. The triage form mentions that he is healthy and up to date with his vaccinations. His mother is requesting a telemedicine visit because she would like a prescription for antibiotics.</p> | <p><b>Slide 6</b></p> <p><b>Case Presentation</b></p> <ul style="list-style-type: none"> <li>• Previously healthy 3-year-old</li> <li>• Two days of poor sleep</li> <li>• Increased fussiness</li> <li>• Complains right ear hurts</li> <li>• Generally, feels "very warm"</li> <li>• Mother requesting antibiotics</li> </ul>  <p>AHRQ Safety Program for Telemedicine: Improving Antibiotic Use</p> <p>Acute Otitis Media in Children 6</p> |

| Slide Title and Commentary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Slide Number and Slide                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| <p><b>Moment 1: Telemedicine Appropriateness</b></p> <p>SAY:</p> <p>Let's start with Moment 1: "Is my patient an appropriate candidate for a telemedicine visit?"</p> <p>When deciding whether it is appropriate for a child with possible acute otitis media to be seen via telemedicine, the most important considerations are: (1) the age of the child and (2) the severity of illness. Additionally, for children who have not completed the routine childhood vaccine series for <i>Streptococcus pneumoniae</i> or <i>Haemophilus influenzae</i> or have underlying immune compromise, it is also very reasonable to have a low threshold to refer the child for an in person visit.</p> <p>There are no strict rules or guidelines about age cutoffs for when it is reasonable to see a child via telemedicine. Age cutoffs vary by practice. If the practice you work with does not have clear guidelines about an age cutoff for a child to be seen virtually with an active concern for infection, such guidelines should be developed. The child in the case is a 3-year-old and generally at lower risk for serious invasive bacterial infections and old enough to acknowledge the presence of symptoms like pain. So, as long as your practice allows you to see children as young as 3 years of age virtually, based on the information on the triage form it is reasonable to see this child via telemedicine.</p> <p>If the patient is 2 years of age or younger, they are generally unable to verbalize symptoms and at higher risk for invasive infections like meningitis, so they should always be seen in person. Note that children following the typical childhood vaccine series should have completed the childhood vaccine series for both <i>Streptococcus pneumoniae</i> and <i>Haemophilus influenzae</i> by 15 months of age—so should be fully vaccinated against pathogens that typically cause acute otitis media by 2 years of age.</p> <p>Based on the information provided from the triage form, it appears reasonable to see this child via telemedicine.</p> | <p><b>Slide 7</b></p> <p><b>Moment 1: Telemedicine Appropriateness</b></p> <ul style="list-style-type: none"> <li>It is reasonable to see children with concerns for acute otitis media via telemedicine <b>UNLESS</b>:             <ul style="list-style-type: none"> <li>Under 2 years of age (or under the age limit your practice allows for virtual visits)</li> <li>Triage form suggests patient appears ill (e.g., lethargic, inconsolable) or has signs concerning for suppurative complications of acute otitis media (postauricular swelling or erythema, meningismus, focal neurologic deficits)</li> </ul> </li> <li>It is reasonable to have a low threshold to refer a child over 2 years of age who does not appear ill for an in-person visit if:             <ul style="list-style-type: none"> <li>Incomplete receipt of primary <i>Streptococcus pneumoniae</i> or <i>Haemophilus influenzae</i> vaccine series</li> <li>Known underlying immune compromise</li> </ul> </li> </ul> <p>AHRQ Safety Program for Telemedicine: Improving Antibiotic Use <span style="float: right;">Acute Otitis Media in Children 7</span></p> |

## Moment 2: History

SAY:

Moment 2 states, “Does my patient have signs and symptoms indicating an infection that may require antibiotics? Is a diagnostic test needed?”

The child in the case is over 2 years of age and over the lower limit for when it is acceptable to see children over telemedicine in your practice. Next, determine if the child has any criteria suggesting a severity of illness level which would preclude him being seen virtually.

The triage form does not suggest he is ill, but this needs to be confirmed when obtaining a history and during the physical examination.

You inquire about the following:

Has he been very sleepy with no interest in eating, drinking, or doing the things he normally likes? Has he been irritable and difficult to console? If so, these could be signs of possible bacterial meningitis. His mother confirms that although he seems irritable, he can be distracted and periodically plays with his sibling. He is able to stand up and walk without any difficulty.

Has she noticed he is not moving his head from side to side or up or down? If so, this could be suggestive of meningitis or an infection in his neck such as a retropharyngeal abscess or cervical adenitis.

Has she noticed any fluid draining from either ear? If so, this could be suggestive of a perforated tympanic membrane. When she looks him face to face, has she noticed one ear is sticking out more than usual? If she looks at the bony area behind the ear (i.e., the mastoid), does she notice it is sticking out or very red? If so, this is suggestive of mastoiditis.

You confirm that his highest temperature at home was 100.9 degrees Fahrenheit as listed on the triage form. He has not had persistent temperatures of 102 degrees and higher.

Although her main concern is an ear infection, it is important to ask about other symptoms that might suggest an alternative diagnosis.

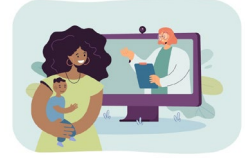
Ask about what his food or liquid intake has been, if he has been vomiting, and approximately how many times he has urinated during the day. If less than four times during the day,

## Slide 8

### Moment 2: History

The following are important to ask about:

- Lethargy
- Lack of interest in drinking any fluids
- Persistent emesis
- Confusion
- Difficulty breathing
- Fever >102 degrees Fahrenheit
- Difficulty moving head
- Pain with movement of neck
- Asymmetrical earlobes
- Pain with urination – suggestive of a urinary tract infection
- Abdominal pain – suggestive of appendicitis or other intra-abdominal process

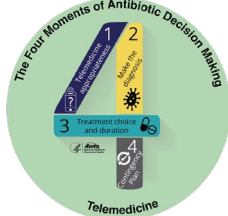


AHRQ Safety Program for Telemedicine: Improving Antibiotic Use

Acute Otitis Media in Children | 5

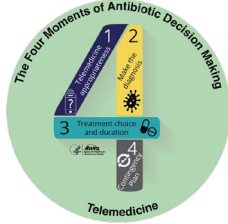
| Slide Title and Commentary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Slide Number and Slide |
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| <p>he may be dehydrated. Emesis in the absence of diarrhea can be concerning for meningitis.</p> <p>You ask about signs of respiratory distress such as nasal flaring, tachypnea, wheezing, or stridor. It is helpful to demonstrate what these look like or sound like. She reports “no” to all of these.</p> <p>You confirm that he does not have any new rashes, abdominal pain, diarrhea, vomiting, or difficulty walking or moving any extremities. He does not complain that it hurts when he pees. If there are any concerns, you should visualize the affected areas more carefully during the physical examination.</p> |                        |

| Slide Title and Commentary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Slide Number and Slide                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| <p><b>Moment 2: Physical Exam</b></p> <p>SAY:</p> <p>As the history is generally reassuring, you proceed with a physical examination. You ask the mother to hold her son in her lap and focus the camera on the child. You request she take his top off. He is looking at the camera with curiosity and does not appear to be lethargic or in distress. He is able to sit up straight without any difficulty. He is breathing comfortably and is not having nasal flaring or tachypnea. You ask the mother to distract him with keys or another object to move his head to the left, right, up, and down by asking. You feel reassured against nuchal rigidity or a retropharyngeal abscess.</p> <p>Ask his mother to try to zoom in and out of both ears to see if there are any gross abnormalities like cellulitis or redness, ear drainage, or protuberant pinna. Ask her to palpate the mastoid bone to assess for tenderness. You inform her that the mastoid bone is the bone directly behind the earlobe.</p> <p>Ask the mother if she has a thermometer and, if she does, to take his temperature. Ask if she has access to a digital otoscope. A digital otoscope could be helpful during the virtual examination for you to evaluate the child's eardrums. The classic examination findings for otitis media include a fluid-filled middle ear and tympanic membrane that is bulging, opaque, yellow, or white. Mention that if she does not have a digital otoscope, that is OK. As they can be costly for parents, mention that it is not necessary that she purchase one.</p> <p>On examination, the child is not ill appearing and there are no gross abnormalities with his ear and no drainage. You decide based on the information you have that it is possible that he has an ear infection, and it is reasonable for the patient to continue to be seen in the virtual setting and to move on to Moment 3.</p> | <p><b>Slide 9</b></p> <p><b>Moment 2: Physical Exam</b></p> <p>Ask the mother to remove child's shirt and point the camera toward the child so you can conduct a physical examination</p> <ul style="list-style-type: none"> <li>• Check general appearance</li> <li>• Observe chest movements</li> <li>• Ask to turn head from side to side and up and down to check for pain with movements or palpitation of the neck</li> <li>• Ask the mother to— <ul style="list-style-type: none"> <li>◦ Zoom in and out of both ears</li> <li>◦ Touch the area behind each earlobe over the mastoid bone</li> <li>◦ Take temperature if thermometer available</li> </ul> </li> </ul> <p>AHRQ Safety Program for Telemedicine: Improving Antibiotic Use <span style="float: right;">Acute Otitis Media in Children 9</span></p> |

| <div>Slide Title and Commentary</div> <div>Moment 3</div> <div>SAY:</div> <div>Moment 3 states, “If antibiotics are indicated, what is the narrowest, safest, and shortest regimen I can prescribe?”</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <div>Slide Number and Slide</div> <div>Slide 10</div> <div>Moment 3</div> <div></div> <div><div><div>1</div><div>Is my patient an appropriate candidate for a telemedicine visit?</div></div><div><div>2</div><div>Does my patient have signs and symptoms indicating an infection that may require antibiotics? Is a diagnostic test needed?</div></div><div><div>3</div><div>If antibiotics are indicated, what is the narrowest, safest, and shortest regimen I can prescribe?</div></div></div> <div><div>AHRQ Safety Program for Telemedicine: Improving Antibiotic Use</div><div>Acute Otitis Media in Children 10</div></div>                                                                                                                                                                            |                                                  |                                                            |                                                             |                                                            |                                                             |           |             |             |             |             |                      |             |             |             |                            |                   |             |             |                      |                            |
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| <div>Decision To Prescribe Antibiotic Therapy</div> <div>SAY:</div> <div>The decision to prescribe antibiotic therapy for suspected acute otitis media during a telemedicine visit should take into account four main factors: age, if there is fluid draining from the ear (or otorrhea), if the symptoms are unilateral or bilateral, and if the child appears to have severe symptoms.</div> <div>Although you are unlikely to see children under 2 years of age in your telemedicine practice as it is more appropriate to see children in this age range in person, antibiotics are almost always prescribed for children under 2 years of age when there is concern for acute otitis media.</div> <div>For children 2 years of age and older, the American Academy of Pediatrics recommends that antibiotics should be considered when otorrhea is present or when severe symptoms are present. Observation can be considered if the presentation is not severe. If there is any doubt, it is better to refer the patient for an in-person visit.</div> | <div>Slide 11</div> <div>Decision to Prescribe Antibiotic Therapy<sup>6-7</sup></div> <div><table><tr><th>Age</th><th>Otorrhea With AOM</th><th>Unilateral or Bilateral AOM With Severe Symptoms</th><th>Bilateral AOM Without Otorrhea and Without Severe symptoms</th><th>Unilateral AOM Without Otorrhea and Without severe symptoms</th></tr><tr><td>&lt;6 months</td><td>Antibiotics</td><td>Antibiotics</td><td>Antibiotics</td><td>Antibiotics</td></tr><tr><td>6 months to &lt;2 years</td><td>Antibiotics</td><td>Antibiotics</td><td>Antibiotics</td><td>Antibiotics or observation</td></tr><tr><td>2 years and older</td><td>Antibiotics</td><td>Antibiotics</td><td>Consider observation</td><td>Antibiotics or observation</td></tr></table></div> <div><div>AHRQ Safety Program for Telemedicine: Improving Antibiotic Use</div><div>Acute Otitis Media in Children 11</div></div> | Age                                              | Otorrhea With AOM                                          | Unilateral or Bilateral AOM With Severe Symptoms            | Bilateral AOM Without Otorrhea and Without Severe symptoms | Unilateral AOM Without Otorrhea and Without severe symptoms | <6 months | Antibiotics | Antibiotics | Antibiotics | Antibiotics | 6 months to <2 years | Antibiotics | Antibiotics | Antibiotics | Antibiotics or observation | 2 years and older | Antibiotics | Antibiotics | Consider observation | Antibiotics or observation |
| Age                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Otorrhea With AOM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Unilateral or Bilateral AOM With Severe Symptoms | Bilateral AOM Without Otorrhea and Without Severe symptoms | Unilateral AOM Without Otorrhea and Without severe symptoms |                                                            |                                                             |           |             |             |             |             |                      |             |             |             |                            |                   |             |             |                      |                            |
| <6 months                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Antibiotics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Antibiotics                                      | Antibiotics                                                | Antibiotics                                                 |                                                            |                                                             |           |             |             |             |             |                      |             |             |             |                            |                   |             |             |                      |                            |
| 6 months to <2 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Antibiotics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Antibiotics                                      | Antibiotics                                                | Antibiotics or observation                                  |                                                            |                                                             |           |             |             |             |             |                      |             |             |             |                            |                   |             |             |                      |                            |
| 2 years and older                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Antibiotics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Antibiotics                                      | Consider observation                                       | Antibiotics or observation                                  |                                                            |                                                             |           |             |             |             |             |                      |             |             |             |                            |                   |             |             |                      |                            |

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| <p><b>Antibiotic Indications for Acute Otitis Media</b></p> <p>SAY:</p> <p>The child in the presentation is 3 years of age. Even if he has an acute otitis media, it does not appear to be severe, and he has no ear drainage, so it is reasonable to hold off on antibiotics. If, however, he had severe symptoms such as high fevers or lethargy, an immediate in-person visit should be recommended as a more comprehensive examination and antibiotic therapy would be warranted.</p> <p>In this child's case you decide to hold off on prescribing antibiotics. Before making a final decision, it is always preferred to practice shared decision making with the family. Verbalize why you believe antibiotics are unnecessary. This could include information about the child's ear infection not appearing severe and the pain could be successfully managed with pain control alone—as will be discussed further.</p> <p>You could also mention that symptoms may take 1–2 days longer to improve without antibiotics, but holding off on antibiotics reduces the risk of antibiotic-associated adverse events like rashes, diarrhea, and the development of antibiotic-resistant bacteria that can make future ear infections more difficult to treat.</p> <p>If the family disagrees, try to understand why as there may be logistical considerations such as multiple other young children at home, return-to-work constraints, etc. Make sure the family members agree with the decision to hold off on antibiotics before proceeding with this plan.</p> | <p><b>Slide 12</b></p> <p><b>Antibiotic Indications for Acute Otitis Media<sup>6-8</sup></b></p> <ul style="list-style-type: none"> <li>• Current case: 3-year-old child <ul style="list-style-type: none"> <li>◦ Lack of severe symptoms and ear drainage – reasonable to hold off on antibiotics after shared antibiotic decision making</li> <li>◦ If he had presented with severe symptoms (e.g., high fever <math>\geq 102^{\circ}\text{F}</math>, lethargy), immediate in person visit should be recommended</li> </ul> </li> </ul>  <p>AHRQ Safety Program for Telemedicine: Improving Antibiotic Use</p> <p>Acute Otitis Media in Children 12</p> |

| Slide Title and Commentary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Slide Number and Slide                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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| <p><b>Selecting Among Antibiotics</b></p> <p>SAY:</p> <p>In this child’s case, you decide to hold off on prescribing antibiotics and the caregiver agrees with this plan.</p> <p>If, however, there was a decision to proceed with antibiotics: The American Academy of Pediatrics Otitis Media clinical practice guidelines state that high-dose amoxicillin is the narrowest and safest antibiotic regimen in all age groups. A high dose of amoxicillin is 45 milligrams per kilogram per dose of amoxicillin every 12 hours. There is no additional need for topical antibiotic ear drops.</p> <p>Amoxicillin-clavulanate is first line for children who received amoxicillin within the previous 30 days, children with concurrent purulent conjunctivitis, or children with a history of recurrent otitis media unresponsive to amoxicillin. Otitis media with concurrent purulent conjunctivitis is most commonly caused by <i>H. influenzae</i>.</p> <p>The reason amoxicillin-clavulanate is first choice in these cases is that otitis media refractory to amoxicillin is most likely caused by microbes that produce beta-lactamase enzymes. Beta-lactamase enzymes causes resistance to amoxicillin. Approximately, 30 to 50 percent of <i>H. influenzae</i> and 100 percent of <i>M. catarrhalis</i> are <math>\beta</math>-lactamase producing. Beta-lactamase–producing <i>H. influenzae</i> and <i>M. catarrhalis</i> do remain susceptible to amoxicillin-clavulanate.</p> <p>For children with nonsevere penicillin allergies, meaning no history of hives or anaphylaxis with a penicillin antibiotic in the past, oral second- and third-generation cephalosporins like cefuroxime or cefdinir, or intramuscular ceftriaxone—which would require an in person visit—are reasonable antibiotic choices. Of note, these antibiotics are also effective for beta-lactamase producing <i>H. influenzae</i> or <i>M. catarrhalis</i>.</p> <p>For children with a severe penicillin allergy, the fluoroquinolone levofloxacin can be considered.</p> | <p><b>Slide 13</b></p> <p><b>Selecting Among Antibiotics<sup>6-7,9</sup></b></p> <ul style="list-style-type: none"> <li>• <b>First-line treatment</b> <ul style="list-style-type: none"> <li>◦ High-dose amoxicillin (45 mg/kg per dose of amoxicillin every 12 hours) <ul style="list-style-type: none"> <li>▪ No additional need for topical antibiotic ear drops</li> </ul> </li> <li>◦ High-dose amoxicillin-clavulanate is first line if recent amoxicillin use (within 30 days), concurrent purulent conjunctivitis, or history of recurrent otitis media unresponsive to amoxicillin</li> </ul> </li> <li>• <b>First-line treatment in case of penicillin allergy</b> <ul style="list-style-type: none"> <li>◦ <u>Non-severe</u> allergy: Oral second- or third-generation cephalosporins (cefuroxime or cefdinir) or intramuscular ceftriaxone (requires in person visit)</li> <li>◦ <u>Severe</u> allergy: Levofloxacin</li> </ul> </li> </ul>  <p>AHRQ Safety Program for Telemedicine: Improving Antibiotic Use</p> <p>Acute Otitis Media in Children 13</p> |

| Slide Title and Commentary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Slide Number and Slide                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                             |                        |                                |                                        |                                       |                                             |
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| <p><b>Duration of Therapy If Decision Is Made To Prescribe Antibiotics for Acute Otitis Media</b></p> <p>SAY:</p> <p>According to The American Academy of Pediatrics, if a decision is made to treat a child with presumed acute otitis media with antibiotics, the following durations are recommended: A 10-day antibiotic course is recommended for children under 2 years of age, a 7-day antibiotic course is recommended for children 2–5 years of age, and a 5- to 7-day course is recommended for children 6 years of age and older.</p>                                    | <p><b>Slide 14</b></p> <p><b>Duration of Therapy if Decision is Made to Prescribe Antibiotics for Acute Otitis Media<sup>6-7,9</sup></b></p> <table><tr><td><b>Children &lt;2 years of age</b></td><td><b>Child 2-5 years</b></td><td><b>Child 6 years and older</b></td></tr><tr><td>• 10-day antibiotic course recommended</td><td>• 7-day antibiotic course recommended</td><td>• 5- to 7-day antibiotic course recommended</td></tr></table> <p>Durations according to American Academy of Pediatric recommendations, for when a decision to treat with antibiotics is made.</p> <p>AHRQ Safety Program for Telemedicine: Improving Antibiotic Use</p> <p>Acute Otitis Media in Children 14</p>                                                                                    | <b>Children &lt;2 years of age</b>          | <b>Child 2-5 years</b> | <b>Child 6 years and older</b> | • 10-day antibiotic course recommended | • 7-day antibiotic course recommended | • 5- to 7-day antibiotic course recommended |
| <b>Children &lt;2 years of age</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Child 2-5 years</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Child 6 years and older</b>              |                        |                                |                                        |                                       |                                             |
| • 10-day antibiotic course recommended                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | • 7-day antibiotic course recommended                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | • 5- to 7-day antibiotic course recommended |                        |                                |                                        |                                       |                                             |
| <p><b>Additional Diagnostic Tests</b></p> <p>SAY:</p> <p>Of note, there is no indication to refer the child for a culture of the ear discharge in the setting of otorrhea as there would be a high likelihood of culturing skin flora.</p> <p>An exception would be the failure of multiple courses of antibiotic therapy or a child who has had frequent ear infections where there is a concern for increasingly antibiotic-resistant organisms. In these cases, a referral to a pediatric ear, nose, and throat doctor for a potential tympanocentesis should be considered.</p> | <p><b>Slide 15</b></p> <p><b>Additional Diagnostic Tests</b></p> <ul style="list-style-type: none"><li>• Case presentation: 3-year-old child<ul style="list-style-type: none"><li>○ No indication to refer for a culture of the ear discharge (otorrhea)</li><li>○ Exceptions:<ul style="list-style-type: none"><li>▪ Failure of multiple courses of antibiotic therapy</li><li>▪ Concern for antibiotic-resistant bacteria</li></ul></li></ul></li></ul>  <p>AHRQ Safety Program for Telemedicine: Improving Antibiotic Use</p> <p>Acute Otitis Media in Children 15</p>                                                                                                                           |                                             |                        |                                |                                        |                                       |                                             |
| <p><b>Moment 4</b></p> <p>SAY:</p> <p>Returning to the Four Moments of Antibiotic Decision Making, Moment 4 is: “What symptomatic relief should I offer or prescribe to my patient? What should I tell my patient about the expected course and the followup plan?”</p>                                                                                                                                                                                                                                                                                                             | <p><b>Slide 16</b></p> <p><b>Moment 4</b></p>  <ol style="list-style-type: none"><li>1. Is my patient an appropriate candidate for a telemedicine visit?</li><li>2. Does my patient have signs and symptoms indicating an infection that may require antibiotics? Is a diagnostic test needed?</li><li>3. If antibiotics are indicated, what is the narrowest, safest, and shortest regimen I can prescribe?</li><li>4. What symptomatic relief should I offer or prescribe to my patient? What should I tell my patient about the expected course and the followup plan?</li></ol> <p>AHRQ Safety Program for Telemedicine: Improving Antibiotic Use</p> <p>Acute Otitis Media in Children 16</p> |                                             |                        |                                |                                        |                                       |                                             |

| Slide Title and Commentary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Slide Number and Slide                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| <p><b>Symptomatic Relief</b></p> <p>SAY:</p> <p>Pain control, regardless of antibiotic decision making, should always be addressed. Ibuprofen or acetaminophen for ear pain or fever can help alleviate symptoms. Alternating them can be considered for additional pain relief since they impact different pain pathways. Even if you decide not to prescribe antibiotics you should consider conveying a plan with the family about pain control until the ear pain resolves.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p><b>Slide 17</b></p> <p><b>Symptomatic Relief</b></p> <ul style="list-style-type: none"> <li>• Always address pain control</li> <li>• Ibuprofen or acetaminophen can help alleviate symptoms of ear pain or fever</li> <li>• Discuss plan to control the pain until the ear pain resolves even if antibiotics not prescribed</li> </ul>  <p>AHRQ Safety Program for Telemedicine: Improving Antibiotic Use <span style="float: right;">Acute Otitis Media in Children 17</span></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p><b>What To Expect and Followup Plan</b></p> <p>SAY:</p> <p>A discussion of what to expect and the followup plan should always occur. Clinical symptoms should begin showing some improvement within 48 to 72 hours, regardless of whether antibiotics were prescribed. Ear pain and body temperature should all return close to normal within 72 hours of antibiotic initiation. Pain control with ibuprofen or acetaminophen generally offers pain relief until the infection begins to resolve.</p> <p>Persistent middle-ear effusion may be present in 60 to 70 percent of children for a few weeks after an episode of otitis media. Because persistent middle-ear effusions may manifest as a mild transient hearing loss, it is important to counsel caregivers on the potential of this phenomenon and that resumption of baseline hearing generally occurs once the effusion is resolved.</p> <p>Patients should seek medical attention if symptoms worsen or fail to demonstrate any improvement within 48 to 72 hours, regardless of whether antibiotics were prescribed or not.</p> | <p><b>Slide 18</b></p> <p><b>What to Expect and Followup Plan<sup>1,6,10</sup></b></p> <ul style="list-style-type: none"> <li>• Clinical symptoms should begin improving within 48-72 hours regardless of whether antibiotics are prescribed or an observation strategy is chosen <ul style="list-style-type: none"> <li>◦ If a watchful waiting approach is used, a rescue antibiotic should be initiated if symptoms worsen at any time or fail to improve within 48 to 72 hours</li> </ul> </li> <li>• Ear pain and body temperature should return close to normal within 72 hours of antibiotic initiation</li> <li>• Persistent middle-ear effusion may be present in 60–70% of children for a few weeks following an episode of otitis media</li> <li>• Patients should seek medical attention if symptoms worsen or fail to improve within the next 48 to 72 hours from the telemedicine visit</li> </ul> <p>AHRQ Safety Program for Telemedicine: Improving Antibiotic Use <span style="float: right;">Acute Otitis Media in Children 18</span></p> |

| Slide Title and Commentary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Slide Number and Slide                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <p><b>When to Go to an Emergency Department?</b></p> <p>SAY:</p> <p>Let the child's mother know that if the child is becoming confused, lethargic, develops emesis, is increasingly tired, or if the child is ill appearing, he or she should promptly go to the emergency department for evaluation for more invasive disease.</p> <p>Acute mastoiditis is a serious bacterial infection of the mastoid bone that may occur in the setting of otitis media. Counsel the mother on the signs of acute mastoiditis, such as tender post-auricular mass or protrusion of the earlobe. If symptoms appear, an emergency room referral is warranted for further assessment.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p><b>Slide 19</b></p> <p><b>When to Go to an Emergency Department?</b></p> <ul style="list-style-type: none"> <li>Worsening, severe symptoms warrant a prompt emergency department visit             <ul style="list-style-type: none"> <li>Becoming confused</li> <li>Lethargic / increasingly tired</li> <li>Emesis</li> <li>Ill appearing</li> <li>Tender post-auricular mass or protrusion of the earlobe</li> </ul> </li> </ul>  <p>AHRQ Safety Program for Telemedicine: Improving Antibiotic Use</p> <p>Acute Otitis Media in Children 19</p>                                                                                                                                                                                                                       |
| <p><b>Take-Home Messages</b></p> <p>SAY:</p> <p>Acute otitis media is a common concern in children.</p> <p>For a verbal child, after a comprehensive review of systems and the medical history and a virtual physical examination, it may be appropriate to manage the child virtually even if there is a high suspicion for otitis media so long as the child is generally well appearing.</p> <p>For younger children, generally under 3 years who are not fully verbal with concerns for acute otitis media, an in-person visit is generally recommended so that a proper examination of the eardrum can occur and the child can be evaluated for alternative invasive bacterial diagnoses.</p> <p>You can review additional resources about how you and your practice will manage acute otitis media in children, such as the <a href="#">one-page summary</a> on managing acute otitis media in the telemedicine setting intended for clinicians and healthcare workers, the <a href="#">sample patient portal scripts</a> for communicating with patient's family members efficiently about acute otitis media, and the <a href="#">patient and family education materials</a>.</p> | <p><b>Slide 20</b></p> <p><b>Take-Home Messages</b></p> <div> <p>✓ Virtual visit</p> <ul style="list-style-type: none"> <li>Appropriate for a verbal child following a comprehensive review of systems, of the medical history, and a virtual physical examination</li> <li>Appropriate to manage virtually even if suggestive of otitis media so long as the child is generally well appearing</li> </ul> <p>✓ In-person visit</p> <ul style="list-style-type: none"> <li>Recommended for young children with concerns for ear pain, generally under 3 years who are not fully verbal</li> <li>Enables examination of the ear drum and evaluation for alternative invasive bacterial diagnoses</li> </ul> </div> <p>AHRQ Safety Program for Telemedicine: Improving Antibiotic Use</p> <p>Acute Otitis Media in Children 20</p> |

| Slide Title and Commentary                                                 | Slide Number and Slide                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
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| <p><b>Disclaimer</b></p> <p>SAY:</p> <p>Please review this disclaimer.</p> | <p><b>Slide 21</b></p> <p><b>Disclaimer</b></p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> </ul> <p>AHRQ Safety Program for Telemedicine: Improving Antibiotic Use <span>Acute Otitis Media in Children 21</span></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p><b>References</b></p> <p>SAY:</p> <p>Here are the references.</p>       | <p><b>Slide 22</b></p> <p><b>References</b></p> <ol style="list-style-type: none"> <li>1. Shaikh N. Otitis media in young children. N Eng J Med. 2025 Apr 10;392(14):1418-1426. PMID: 40214033.</li> <li>2. Wald ER, DeMuri GP. Antibiotic recommendations for acute otitis media and acute bacterial sinusitis: conundrum no more. Pediatr Infect Dis J. 2018 Dec;37(12):1255-57. PMID: 29570583.</li> <li>3. Kaur R, Schuz S, Sherman A, Andrejko K, Kobayashi M, Pichichero M. Anticipated effects of higher-valency pneumococcal conjugate vaccines on colonization and acute otitis media. Pediatr Infect Dis J. 2024 Oct 1;43(10):1004-1010. PMID: 38936209</li> <li>4. Schilder AGM, Chonmaitree T, Cripps AW, et al. Otitis media. Nat Rev Dis Primers. 2016 Sep 8;2(1):16063. PMID: 27604644</li> <li>5. Pagano AS, Wang E, Yuan D, Fischer D, et al. Cranial indicators identified for peak incidence of otitis media. Anat Rec (Hoboken). 2017 Oct;300(10):1721-40. PMID: 28628951</li> <li>6. Lieberthal AS, Carroll AE, Chonmaitree, et al. The diagnosis and management of acute otitis media. Pediatrics. 2013 Mar;131(3):e964-99. PMID: 23439909.</li> <li>7. Kimberlin DW, Barnett ED, Lynfield R, et al. 2021–2024 Report of the Committee on Infectious Diseases. Pediatrics. 2021.</li> <li>8. Driver S, Mathias S, Fung A, et al. Clinical signs associated with mortality and sepsis in young infants: a systematic review and meta-analysis. JAMA Pediatr. 2026 Apr 1;180(4):384-393. PMID: 41627635.</li> <li>9. Hoberman A, Paradise JL, Rockette HE, et al. Shortened antimicrobial treatment for acute otitis media in young children. N Engl J Med. 2016 Dec 22;375(25):2446-56. PMID: 28002709.</li> <li>10. Venekamp RP, Sanders SL, Glasziou PP, et al. Antibiotics for acute otitis media in children. Cochrane Database Syst Rev. 2023 Nov 15;11(11):CD0000219. PMID: 37965923.</li> </ol> <p>AHRQ Safety Program for Telemedicine: Improving Antibiotic Use <span>Acute Otitis Media in Children 22</span></p> |

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