Antibiotic Decision Making

Potential Barriers and Suggested Ideas for Change

Condition: Group A Streptococcal Pharyngitis

Rationale: Judicious antibiotic decision making for group A streptococcal (GAS) pharyngitis requires the use of validated clinical diagnostic criteria, as established by clinical guidelines. It involves testing only when indicated, proper testing, prescribing antibiotics only when there is a positive test result, choosing the right antibiotics, and administering them in the correct way. Education is essential for engaging the patient/family in shared-decision and ensuring appropriate follow-up.

Potential Barriers	Suggested Ideas for Change	Still Not Seeing Results?
Gap: GAS Pharyngitis not diagnosed by physician during exam in the office		
Practice does not have a policy requiring face-to-face encounters with a clinician for diagnosis of acute streptococcal pharyngitis. Or, practice does not have an effective triage system in place.	✓ Develop and communicate practice policies to ensure a triage system is established and used appropriately. Consider the following policies: ✓ Decision to test must be based on a physical examination by a clinician. ✓ Do not use nurse-only visits for diagnosis or treatment. ✓ Do not allow prescribing over the phone or video visit.	✓ Review the key clinical activity (KCA), **Diagnose Infection Accurately**, for more information on this topic. ✓ Brainstorm with practice staff for ideas to improve your triage system in order to reduce diagnoses without a physical exam by a clinician. ✓ Consult with other practices about their procedures for triage.
Gap: Diagnosis is not based on clinical criteria (ie, GAS symptoms, signs, and features) and confirmed with rapid antigen detection test or throat culture as needed		
Clinicians and/or staff may not recognize the importance of using strict criteria to diagnose GAS pharyngitis.	• Review the guidelines and recommendations that discuss the importance of accurately diagnosing infections to avoid misuse of antibiotics and avoid antibiotic resistance: ✓ AAP *Red Book 2021*: Group A Streptococcal Infections—Treatment ✓ AAP 2021 Policy Statement Antibiotic Stewardship in Pediatrics ✓ 2012 IDSA guideline for GAS pharyngitis ✓ Antibiotic Decision Making for Acute Streptococcal Pharyngitis flowchart, a tool created for this course that summarizes the essential diagnostic criteria for GAS pharyngitis and provides a systematic approach for the diagnostic evaluation.	• Review the KCA, **Diagnose Infection Accurately**, for more information on this topic. • Discuss with all staff the importance of accurate diagnoses and stress the following: ✓ Inappropriate diagnosis may lead to inappropriate use of antibiotics. ✓ Antibiotic overuse is a serious health threat. ✓ Drug-related adverse events and antibiotic resistance can result from unnecessary antibiotics.

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	✓ AAP *Red Book* 2021 Section 4: Antimicrobial Resistance and Antimicrobial Stewardship: Appropriate and Judicious Use of Antimicrobial Agents ✓ CDC Antibiotic Resistance Threats in the United States, 2019 ✓ CDC Program: *Be Antibiotics Aware*	✓ Accurate diagnoses lead to appropriate treatment and judicious antibiotic use. • Ensure all clinicians are aware of the criteria to diagnose streptococcal pharyngitis.
Gap: A rapid antigen detection test or throat culture not performed		
Practice does not have clear guidelines as to when testing is appropriate. – Testing occurs when not appropriate. – Testing is not consistently used to confirm a diagnosis. – Treatment is given without testing.	• Develop and communicate practice policies to all clinical staff including nurses, technicians, medical assistants and nonclinical staff regarding: ✓ Testing is performed when appropriate. Criteria for testing include: – Patient is over 3 years of age. – Patient must have a sore throat. – Patient displays one or more symptoms that indicate pharyngitis: • Pharyngeal erythema • Tonsillar exudate • Palatal petechiae • Tender cervical nodes • Scarlatiniform rash • Swollen, red uvula – Patient does not have viral symptomology: • Cough • Hoarseness • Coryza, conjunctivitis • Viral exanthem (maculopapular rash) • Mouth ulcers • Diarrhea • Antibiotic treatment should not occur without positive results from testing (rapid antigen detection test or throat culture). • The use of a serologic assays for group A streptococcus is not recommended to diagnose GAS pharyngitis.	✓ Review the KCA, **Diagnose Infection Accurately**, for more information on this topic. ✓ Reinforce with staff the rationale behind the testing policies: ✓ There is potential for a missed alternative diagnosis if testing is obtained unnecessarily. ✓ Treatment without positive test result is an inappropriate use of antibiotics and may result in drug-related adverse events and antibiotic resistance.

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	• Consult the Antibiotic Decision Making for Acute Streptococcal Pharyngitis flowchart to assist in testing, diagnosing, and treating GAS pharyngitis.	
Staff may not have skills or knowledge to obtain adequate samples (rapid detection test or throat culture).	• Review literature describing proper throat culture technique: ✓ Cohen JF, Bertille N, Cohen R, Chalumeau M. Rapid antigen detection test for group A streptococcus in children with pharyngitis. *Cochrane Database Syst Rev.* 2016;7(7):CD010502. Available at: https://www.cochrane.org/CD010502/ARI_what-performance-rapid-tests-diagnosis-strep-throat-children. Accessed June 7, 2012 ✓ Optimal site for throat culture: Tonsillar surface vs posterior pharyngeal wall. *Eur Arch Otorhinolaryngol.* 2006 Aug;263(8):750-753 ✓ AAP *Red Book 2021*: Group A Streptococcal Infections—Diagnostic Tests • Review information on rapid diagnostic testing technique: ✓ AACC Clinical Laboratory News article, The Evolution of Group A Streptococcus Pharyngitis Testing ✓ Nursing2020 Clinical Do's and Don'ts Obtaining a Throat Culture ✓ YouTube Video: How to Perform a Throat Swab on a Patient • Be aware that the American Academy of Pediatrics (AAP) discourages use of home testing. Although the Food and Drug Administration has approved a variety of rapid tests for use in home settings, their use by parents is discouraged because of the possibility of poor sensitivity and risk of testing when it is not indicated.	✓ Conduct a workshop with relevant staff to demonstrate correct technique of the test used in your office. Emphasize quality control. The sensitivity of the test is dependent on the quality of the throat specimen and the experience of the person performing the test.
Gap: Inappropriate prescribing of antibiotics for patients with only viral symptoms		
Lack of awareness of, or access to, the clinical guideline recommendations for the correct treatment of acute streptococcal pharyngitis.	• Review the following for appropriate management of diagnosed streptococcal pharyngitis: • Table 2, *Antibiotic Regimens Recommended for GAS pharyngitis* in the 2012 IDSA guideline for GAS pharyngitis.	• Review the KCA, **Treat Infection Effectively**, for more information on this topic.

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	• Antibiotic Decision Making for Acute Streptococcal Pharyngitis flowchart created for this course. • Shapiro D, Lindgren C, Newman M, Fine M. Viral features and testing for streptococcal pharyngitis. *Pediatrics.* 2017;139(5):e20163403	• Conduct a Lunch-and-Learn or similar session with fellow clinicians to review the treatment recommendations using the guidelines and flowchart tool listed at left.
Gap: Patients with acute streptococcal pharyngitis not appropriately treated with penicillin or amoxicillin *(unless previously severe or nonsevere allergic reaction)*		
Lack of awareness of, or access to, the clinical guideline recommendations for the treatment of GAS pharyngitis: • First-line treatment • Treatment if penicillin or amoxicillin allergy • Treatments that should not be prescribed	• Obtain and review the following: ✓ Table 2, *Antibiotic Regimes Recommended for GAS pharyngitis* in the 2012 IDSA guideline for GAS pharyngitis ✓ Pharyngitis—Principles of Judicious Use of Antimicrobial Agents ✓ Use a diagnostic and treatment tool for GAS pharyngitis such as the Antibiotic Decision Making for Acute Streptococcal Pharyngitis flowchart created for this course. Make the diagnostic and treatment flowchart available in examination rooms. ✓ Initial Antibiotic Management Dosage and Course Table created for this course. ✓ AAP *Red Book 2021*: Group A Streptococcal Infections—Treatment	• Review the KCA, **Treat Infection Effectively**, for more information on this topic. • Conduct a Lunch-and-Learn or similar session with fellow clinicians and review appropriate treatment using the guidelines and tools described in this row.
The causes of acute pharyngitis are not known or considered.	• Review Table 3: Microbial Etiology of Acute Pharyngitis in the 2012 IDSA guideline for GAS pharyngitis. • The US has growing rates of GAS macrolide/azilide resistance; therefore, it is important to know the rate in your area before prescribing a macrolide/azilide antibiotic.	• Review resources that inform local geographic resistance patterns, including: ✓ Antibiotic / Antimicrobial Resistance (AR / AMR) Investing in States: Map
Lack of understanding of the frequency of chronic carriage of group A streptococcus and the implications for management of a child with recurrent symptoms.	✓ Educate clinicians regarding: ✓ Frequency of chronic carriage of GAS pharyngitis is 20% in late winter and spring months. ✓ GAS pharyngitis carriers do not generally require antibiotics and are at low risk for suppurative and nonsuppurative complications and for transmitting GAS.	• Refer to the following resources: ✓ Page 11: Evidence Summary in the 2012 IDSA guideline for GAS pharyngitis ✓ Section 3 of the AAP *Red Book 2021:* Summaries of Infectious

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	✓ Most children who have asymptomatic carriage do not require therapy unless they are at high risk of complications from infection. Other considerations include: – Local outbreak of acute rheumatic fever (ARF) or post-strep glomerulonephritis – Outbreak in a closed community – Family history of ARF – Recurrent episodes occurring over many weeks in a family 1. If treatment is recommended, consider clindamycin. 2. Other antibiotic regimens can be utilized (see references at right).	Diseases>Group A Streptococcal Infections
Clinicians may lack knowledge regarding the impact of antibiotics on the course of pharyngitis and on the occurrence of suppurative and nonsuppurative complications.	• The average duration of symptoms for GAS pharyngitis without treatment is 3–5 days, and patients should improve in 1–2 days with antibiotics unless a suppurative complication develops or the wrong diagnosis was made. Thus, if symptoms (ie, sore throat) persist longer than 5 days, clinicians should consider another diagnosis. Review the following references: ✓ 2012 IDSA guideline for GAS pharyngitis ✓ AAP 2021 Policy Statement Antibiotic Stewardship in Pediatrics ✓ Illness Duration Table created for this course	• Review the article, Duration of symptoms of respiratory tract infections in children: Systematic review. *BMJ.* 2013;347:f7027 doi: 10.1136/bmj.f7027 (Published 11 December 2013)
Gap: Inappropriate prescribing of second-line antibiotics		
Misconception regarding the existence of penicillin resistance in group A streptococcus.	• Educate clinicians that GAS pharyngitis has essentially 100% susceptibility to penicillin and cephalosporins. (See Antibiotic Resistance in Appendix for more detail.) • Refer to Page 11: Evidence Summary in the 2012 IDSA guideline for GAS pharyngitis and Section 4 of the AAP *Red Book 2021:* Principles of Appropriate Use of Antimicrobial Therapy for Upper Respiratory Tract Infections.	• Review the KCA, **Treat Infection Effectively**, for more information on this topic.
Lack of conceptual framework regarding broad-spectrum vs narrow-spectrum antibiotics, especially the role of broad-	• Review the following to learn about broad-spectrum vs narrow-spectrum antibiotics: ✓ AAP 2021 Policy Statement Antibiotic Stewardship in Pediatrics	• Consult your local knowledge base, for example: ✓ AAP Chapter ✓ Local hospital antibiogram

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spectrum antibiotics in promoting resistance and disrupting normal flora.	✓ CDC Antibiotic Resistance Threats in the United States, 2019 ✓ The Human Microbiome and Its Potential Importance to Pediatrics	✓ Local Peds ID group ✓ AAP NCE meeting ✓ Local microbiologist
Lack of a clear understanding of true antibiotic allergy and possible adverse events associated with choice of antibiotic.	• Review the following: ✓ *Is It Really a Penicillin Allergy?* CDC handout ✓ AAP 2021 Policy Statement Antibiotic Stewardship in Pediatrics ✓ A Review of Evidence Supporting the American Academy of Pediatrics Recommendation for Prescribing Cephalosporin Antibiotics for Penicillin-Allergic Patients ✓ Clinical Practice Guidelines for *Clostridium difficile* Infection in Adults and Children: 2017 Update by the Infectious Diseases Society of America (IDSA) and Society for Healthcare Epidemiology of America (SHEA) ✓ Nonsevere and Severe Allergic Reactions ✓ *AAP News* article, Why's and how's of judicious antibiotic prescribing for URIs ✓ Blumenthal KG, Peter JG, Trubiano JA, Phillips EJ. Antibiotic allergy. *Lancet.* 2019;393(10167):183-198 ✓ List of additional antibiotic allergy resources included in this EQIPP course.	• Conduct a Lunch-and-Learn or other comparable session to share resources and to review the concept of true antibiotic allergies with practice clinicians. • Review the specifics and classify the antibiotic reaction for any child in whom an antibiotic allergy is reported.
Gap: Risks of antibiotic therapy not discussed with patient/family and documented in medical record		
There is no systematic practice to document the discussion of antibiotic risks in the patient's chart.	• Devote part of the visit flow to share with patient/family the recommended treatment and why it is recommended. This should include a discussion about the risk and possible adverse events from antibiotic therapy. It is important to document such discussion in the medical record. • Prepare to respond to parents' concerns and questions about the recommended amoxicillin (or penicillin) antibiotic treatment. • Document all family discussions in the medical record.	• Review the KCA, **Provide Guidance and Education**, for more information on this topic. • Make documentation a check box on the sick-visit flow for review of risks. • Consult the Antibiotic Guidance and Education Checklist created for this course for a summary of key messages and key information to share with parents.

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Patient/family requests that antibiotics or a specific antibiotic should be prescribed.	• Consider using selected resources for discussion with parents. Consider the following resources: ✓ AAP Parent Education Online (requires subscription). – Antibiotics Aren't Always Needed – Common Childhood Infections ✓ HealthyChildren.org articles: – Antibiotic Prescriptions for Children: 10 Common Questions Answered – How Do Antibiotics Work? – Guidelines for Antibiotic Use – Caring for Your Child's Cold or Flu – Antibiotics for a Sore Throat, Cough or Runny Nose? – Why Most Sore Throats, Coughs & Runny Noses Don't Need Antibiotics ✓ CDC Program: *Be Antibiotics Aware* • Distribute the Patient and Family Antibiotic Information Resource List created for this course. • Make antibiotic use information resources available in examination rooms, waiting rooms, on practice Web site, on patient portal, etc. • Review the online Antibiotics Tutorial available from the University of Washington interactive Medical Training Resources (iMTR) at https://www.uwimtr.org/dart/.	• Meet with practice staff to: ✓ Discuss the importance of a practice policy for addressing parental pressure and the best way to communicate the policy. ✓ Brainstorm ideas for your specific patient population to address the common concerns and misconceptions clinicians face. ✓ Develop answers to parents' common questions, beliefs, and resistance. • Use available resources to educate parents. ✓ Patient and Family Antibiotic Information Resource List created for this course ✓ HealthyChildren.org articles ✓ CDC Program: *Be Antibiotics Aware* • Practice antibiotic stewardship in your practice. Use these resources: ✓ CDC's Core Elements of Antibiotic Stewardship ✓ Antimicrobial stewardship in pediatrics: how every pediatrician can be a steward • Create a Judicious Use portal on your practice Web site with educational resources, including information on your practice's approach to common clinical infections. • Elect an antibiotic educator to guide and educate patients and families on antibiotics.

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There is no systematic practice to document the discussion of antibiotic risks in the patient's chart.	• Devote part of the visit flow to discuss risk and possible adverse events from antibiotic therapy and to document the discussion in the patient's medical record.	• Make documentation a check box on the sick-visit flow for review of risks.
The sick-visit flow does not include informing the patient/family of effective treatment options and judicious use of antibiotics.	• Devote part of the visit flow to inform patient/family of the following: ✓ When testing is necessary and appropriate ✓ Recommended antibiotic treatment (if any) and why that treatment is optimal ✓ Antibiotic dose and course ✓ The need to complete entire course ✓ Consult the Antibiotic Guidance and Education Checklist created for this course for a summary of key information to review with patients and families.	• Use selected resources to educate the patient/family about effective treatment and judicious use of antibiotics. (See resources listed in row below.) • Share with parents articles that stress the need for adherence, such as Guidelines for Antibiotic Use from Healthychildren.org. • Review the Policy Statement—Guidance for the Administration of Medication in School.
The practice does not have adequate resources to educate parents about effective treatment of GAS pharyngitis and the judicious use of antibiotics.	✓ Select and utilize resources to educate patents/families: ✓ AAP Patient Education Online (requires subscription): ✓ Antibiotics—When Do They Help? ✓ Common Childhood Infections ✓ HealthyChildren.org articles, as previously described ✓ CDC Program: *Be Antibiotics Aware* ✓ Consult the Antibiotic Guidance and Education Checklist created for this course for a summary of key information to review with patients and families. ✓ Distribute Patient and Family Antibiotic Information Resource List created for this course. ✓ Create and post a Commitment Letter in the practice waiting and/or examination rooms. A Commitment Letter is a poster-size letter to display in the practice's office which may include photographs and signatures of clinicians along with their commitment to reduce	• Create a Judicious Use portal on your practice Web site, with educational resources including information on your practice's approach to common clinical infections. • Elect an antibiotic educator to guide and educate patients and families on antibiotics. • Develop answers to parents' common questions, beliefs, and resistance for use by staff. • Provide scripts to address symptomatic care for viral URI such as the Prescription Pads from the CDC. • See CDC's Antibiotic Use in Outpatient Settings: Materials and References, available in several languages. The Patient

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	inappropriate use of antibiotics. See CDC's *Be Antibiotics Aware*: Posters—Commitment Letter for an example.	and Healthcare Provider Information includes resources such as: ✓ Handouts ✓ Prescription Pads ✓ Social Media and Web Graphics ✓ Videos • Post judicious antibiotic use information and policies in waiting rooms, examination rooms, on the practice Web site, patient portal, etc. • Inform the patient/family of infection prevention techniques.
Practice does not have protocols to ensure the patient/family is informed to begin antibiotics if the rapid detection test is negative and the throat culture result is positive.	• Devote part of your visit flow to inform the patient/family of the need to start antibiotics in the setting of a negative rapid antigen detection test and positive throat culture results.	• Consult the Antibiotic Guidance and Education Checklist created for this course for a summary of key information to review with patients and families.

Appendix

Drug-Related Adverse Events

Possible drug-related adverse events may occur from antibiotic treatment. Some may result in additional medical visits, tests, or cost. They may even require hospitalization or be life-threatening.

Toxicity

- Toxicity can occur due to improper dosing or impaired drug metabolism.

Side Effects

- Most side effects are known and generally predictable.
- Mild side effects may include vomiting, abdominal pain, diarrhea, and nonpruritic rashes, including diaper rashes.
- Severe side effects may include *C. difficile* colitis.

Allergies/Hypersensitivity Reactions

- IgE-mediated allergies may include symptoms such as hives/urticaria, angioedema, wheezing, and anaphylaxis.
- Non–IgE-mediated hypersensitivity reactions can be severe (eg, Stevens-Johnson syndrome and toxic epidermal necrolysis).

See *Is it Really a Penicillin Allergy?* and antibiotic allergy resources included in this EQIPP course for more information about antibiotic allergies.

Nonsevere and Severe Allergic Reactions

- **Non-severe** symptoms include hives or pruritic (itchy) rashes.
- **Severe** symptoms include anaphylaxis, angioedema, throat tightening, wheezing plus shock, airway compromise, or cardiovascular collapse. Cardiac collapse requires intervention (eg epinephrine, corticosteroids, vasopressors).

Note: Side effects such as vomiting, abdominal pain, and diarrhea are *non-allergic*.

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Antibiotic Resistance

Antibiotic resistance refers to bacteria that have become resistance to the antibiotics designed to kill them. The overuse and/or inappropriate use of antibiotics can result in the drugs' ability to treat the infection.

Infection Prevention Techniques

Following are some important infection prevention techniques to share with families:

- ✓ Recommend pneumococcal conjugate vaccine for all children based on the schedule of the Advisory Committee on Immunization Practices of the CDC, AAP, and AAFP.
- ✓ Recommend annual influenza vaccine for all children according to the schedule of the Advisory Committee on Immunization Practices of the CDC, AAP, and AAFP.
- ✓ Encourage avoidance of tobacco smoke exposure.
- ✓ Encourage hand washing.

Illness Duration Table

Average illness duration in days and time to symptom resolution in days for 50% and 90% of children with common respiratory illnesses.

Illness	Average duration of illness (days)	Symptom resolution by Day 3 (%)	Symptom resolution by Day 7 (%)
Acute otitis media	2–8 depending on self-resolution and response to therapy	50	90
Viral sore throat/tonsillitis/pharyngitis	2–7	63–66	
Streptococcal pharyngitis	3.5 without antibiotics 1–2 with antibiotics		100
Common cold**†	10–14		50 90 by 15 days

**Symptom resolution is reported at days 10 and 15 instead of day 7.
†There is much overlap with sinusitis, and it is persistence of symptoms or sudden worsening of symptoms that raise suspicion of bacterial sinusitis.

Reference: Thompson M, Vodicka TA, Blair PS, et al. Duration of symptoms of respiratory tract infections in children: systematic review. *BMJ.* 2013;347:f7027