Antibiotic Decision Making

Potential Barriers and Suggested Ideas for Change

Condition: **Acute Bacterial Sinusitis**

Rationale: The AAP recommends that clinicians are familiar with current guidelines and recommendations for the diagnosis and treatment of acute bacterial sinusitis (ABS), including:1) assessment for observation (watchful waiting) as appropriate; 2) judicious antibiotic prescribing (only when needed to treat the infection); 3) choosing the right antibiotic; 4) administering the medicine correctly; 5) close follow-up; and 6) shared-decision making with the patient/family. Such efforts can lead to improved patient outcomes and limit the overuse and misuse of antibiotics, resulting in avoidable drug-related adverse events and antibiotic resistance.

Potential Barriers	Suggested Ideas for Change	Still Not Seeing Results?
Gap: Diagnosis not made using guideline-based criteria		
Clinicians and/or staff may not recognize the importance of using strict criteria to diagnose ABS.	• Review the guidelines and recommendations that support this importance: ✓ AAP 2021 Policy Statement Antibiotic Stewardship in Pediatrics ✓ CDC Antibiotic Resistance Threats in the United States, 2019 Centers for Disease Prevention (CDC) *Be Antibiotics Aware* ✓ CDC Antibiotic Prescribing and Use in Doctor's Offices: Pediatric Treatment Recommendations ✓ 2021 AAP Red Book Section 4: Principles of Appropriate Use of Antimicrobial Therapy for Upper Respiratory Tract Infections: Acute Sinusitis	• Review the key clinical activity (KCA), **Diagnose Infection Accurately**, for more information on this topic. • Meet with staff to discuss the importance of accurate diagnoses for optimal patient care. Inappropriate diagnosis may lead to inappropriate use of antibiotics, which can cause adverse drug effects and the emergence of antibiotic resistance.
There is a lack of knowledge of the signs and symptoms for the evidence-based diagnosis of ABS.	• Review the criteria to diagnose ABS in patients 12 months or older: ✓ AAP Clinical Practice Guideline for the Diagnosis and Management of Acute Bacterial Sinusitis in Children Aged 1 to 18 Years • Be aware of possibility of an alternative or noninfectious diagnosis that overlaps or mirrors ABS, including: ✓ Viral URIs (eg, rhinovirus) ✓ Allergic rhinitis (eg, seasonal allergy) ✓ Nonallergic rhinitis (eg, vasomotor) ✓ Foreign body ✓ Irritants	• Conduct a Lunch-and-Learn session with fellow clinicians and review the resources provided in this grid to ensure that all clinicians are aware of the criteria to diagnose ABS. • Expand the discussion to include alternative noninfectious diagnosis that overlap, or mirror ABS seen in your patient population.

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The practice does not have a systematic approach for applying diagnostic criteria. ✓ Lack of a clear tool for diagnosis ✓ Lack of access to diagnosis information/tool	• Institute the use of Antibiotic Decision Making for Acute Bacterial Sinusitis flowchart, a tool created for this course that summarizes the essential diagnostic criteria for ABS and provides a systematic approach for applying diagnostic criteria. • Make the diagnostic tool available in examination rooms.	• Alternately, create your own diagnostic tool for ABS. The tool should have clear criteria for discerning between viral and bacterial infections, with emphasis on the detailed criteria for diagnosing ABS.
Clinicians may not be aware that imaging (sinus radiograph, CT, or MRI) of sinuses is not useful for diagnosing ABS EXCEPT in the case of suspected complications such as orbital cellulitis or intracerebral abscesses.	• Review *Key Action Statement 2A* in the AAP 2013 ABS Guideline pertaining to the use of imaging. • Develop and communicate practice-wide imaging policies that clearly outline when imaging is useful and any associated issues/risks with use of imaging. ✓ Imaging (plain, CT, or MRI) of sinuses is not useful and should not be used to diagnose ABS EXCEPT in the case of suspected complications such as orbital cellulitis or intracerebral abscesses. ✓ Radiographs and CT do not help diagnose and may needlessly expose patients to radiation. ✓ A CT scan is appropriate if signs of orbital cellulitis (eg, impaired extraocular movements) or CNS (central nervous system) signs or symptoms are present on history and/or physical examination.	• Expand the Lunch-and-Learn to discuss the use of imaging for ABS within the practice.
The practice does not have an effective triage system to optimize an accurate diagnosis.	• Develop and communicate practice policies to ensure a triage system is established and used appropriately in order to ensure accurate diagnoses. Consider the following elements: ✓ Diagnoses 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.	• Brainstorm with practice staff for ideas to improve your triage system to reduce diagnoses without a physical exam by a clinician. • Consult with other practices about their procedures for triage.
Gap: Assessment for observation (ie, watchful waiting) not made when criteria for persistent illness is met		
The initial observation (watchful waiting) option is not presented to patients/ families because it is not understood for persistent illness (not appropriate for severe or worsening illness).	• Review Table 2, *Recommendations for Initial Use of Antibiotics for Acute Bacterial Sinusitis* in the AAP 2013 ABS Guideline. • Make the option of initial observation (watchful waiting) part of your treatment flowchart for persistent illness. • Use CDC's *Be Antibiotics Aware*: Delayed Prescribing and Watchful Waiting Prescription Pads.	• Review the KCA, **Diagnose Infection Accurately**, for more information on this topic. • Meet with clinicians to review the guidelines for offering initial observation and discuss any concerns.

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Potential Barriers	Suggested Ideas for Change	Still Not Seeing Results?
Gap: 48–72 hours follow-up plan not established and documented for patients under observation		

There are no systems in place to establish, communicate, and document a follow-up plan in the patient's chart (eg, appointment, phone call) to ensure clinical improvement within 48 to 72 hours of diagnosis.	• Create a clear practice protocol for following up on patients, especially those for whom a watchful waiting plan has been determined. Consider the following in the protocol:
	  ✓ Routine discussion and selection of a follow-up plan at the patient visit
	  ✓ Selection of any preferred mean(s) of follow-up: appointment, phone call, e-mail, etc, for the practice
	  ✓ Patient charting to include documentation of the follow-up plan
	  ✓ Parent guidance to stress importance of following up if no improvement
	• Review documentation practices and develop a clear practice protocol for documenting the follow-up plan in the patient charts.
	  ✓ Consider making a check box on the sick-visit flow for communicating the need for follow-up.
	  ✓ Consider the use of staff responsibility for following up within 72 hours if the patient/family does not.
		• Review the KCA, **Treat Infection Effectively**, for more information on this topic.
		• Discuss with staff the importance of establishing/documenting a follow-up plan when watchful waiting is utilized or in cases where the patient has not improved. Get agreement on a protocol to achieve follow-up. Identify issues and adjust the protocol.
		• Develop a patient education campaign stressing the importance of follow up when the child's symptoms do not improve.
		• Publicize the importance of follow-up on the practice Web site.
		• Create a prescription-like pad that indicates when and how to follow up.

Gap: Risks of antibiotic therapy not discussed with patient/family		

Clinicians may not have complete knowledge of the range of risks and adverse events associated with antibiotic use, including allergy.	• Make it a part of the practice protocol to always discuss side effects and allergic reaction with the patient/family. Antibiotic resistance should also be discussed if the patient/family has concerns. Document discussions in the patient records.
	• Review the following:
	  ✓ CDC Antibiotic Resistance Threats in the United States, 2019
	  ✓ This course's discussion of Drug-Related Adverse Events
	  ✓ A Review of Evidence Supporting the American Academy of Pediatrics Recommendation for Prescribing Cephalosporin Antibiotics for Penicillin-Allergic Patients
		• Review the KCA, **Provide Guidance and Education**, for more information on this topic.
		• Put checks and balances in place to ensure that clinicians understand the risks of antibiotics, discuss risks with the patient/family, and document discussions in patient records.

Potential Barriers	Suggested Ideas for Change	Still Not Seeing Results?
	✓ 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)	
Resources are not available (or not utilized) to guide patient/family discussion of the use of and risks related to antibiotics.	• Consider the following: 　✓ Patient and Family Antibiotic Information Resource List, created for this course 　✓ AAP Pediatric Patient Education Online (requires subscription) 　　– Antibiotics—When Do They Help? 　　– Common Childhood Infections 　　– Sinusitis and Your Child 　✓ CDC's *Be Antibiotics Aware* Resources: 　　– Handouts 　　– Prescription Pads 　　– Social Media and Web Graphics 　　– Videos • Centers for Disease Prevention (CDC): Antibiotic Prescribing and Use in Doctor's Offices: About Antibiotic Use • Also see the barrier, *Clinicians lack resources or are unsure how to deal with parental misconceptions or pressure about antibiotic use*, later in this grid for additional family resources.	• Utilize information from HealthyChildren.org articles and this course's summary of Drug-Related Adverse Events to create your own patient handout or talking points regarding antibiotic use. • Create a Judicious Use portal on your practice Web site with educational resources including information on judicious use of antibiotics. • 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. For example, CDC's *Be Antibiotics Aware* Prescription Pads.
Education on antibiotic use and risks are not part of the practice's standard visit flow. Or there is not enough time in the visit to adequately counsel patients/families.	• Consider making discussion and/or brochure about antibiotic use and risks a routine part of sick visits for respiratory conditions. The Patient and Family Antibiotic Information Resource List and Antibiotic Guidance and Education Checklist created for this course can help. Education should include: 　✓ Option for watchful waiting when appropriate 　✓ Recommended antibiotic treatment (if any) and why optimal 　✓ Antibiotic dose and course 　✓ Imaging only indicated if their child is suspected of having a complication of the sinus infection 　✓ Dispel myth about quality of mucus secretions and type of infection 　✓ Options for treatment of symptoms 　✓ Infection prevention techniques	• Utilize information from HealthyChildren.org articles and this course's Drug-Related Adverse Events to create your own patient handout or talking points regarding antibiotic use and risks. • Create and post a Commitment Letter (which may include photographs and signatures of providers) stating commitment to reduce inappropriate use of antibiotics. • Enlist the antibiotic educator to evaluate and offer suggestions for

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	• Consider making antibiotic education a routine part of designated well-child visits so families are aware of your antibiotic prescribing practices. • Post antibiotic use information (perhaps including information on your practice's approach to common clinical infections) as well as your practice's policy on judicious prescribing in examination and waiting rooms, practice Web site, patient portal, etc.	improving the visit flow to include antibiotic education.
There is no systematic practice to document the discussion of antibiotic risks in patient charts.	• Devote part of the visit flow to discuss risk and possible adverse events and to document that discussion in the patient's medical record.	• Make it a check box on the sick-visit flow for review of risks.
Gap: Unnecessary or inappropriate (choice, dose, or duration) antibiotics prescribed		
There is a lack of awareness of, or access to, the clinical guideline recommendations for the correct treatment of ABS, including: • First-line treatment • Treatment if penicillin or amoxicillin allergy • Treatments that should not be prescribed	• Review the guidelines and recommendations for the diagnosis and treatment of ABS listed in Rows 1 and 2 of this grid. In particular, see the following tables in the AAP 2013 ABS Guideline: ✓ Table 2, *Initial Use of Antibiotics for Acute Bacterial Sinusitis* ✓ Table 4, *Management of Worsening or Lack of Improvement at 72 Hours* If the <u>microbiology of ABS</u> is not understood or considered, review: ✓ *Key Action Statement 4; KAS Profile 4 on p. e270* If <u>geographic resistance patterns</u> are not understood or considered, review: ✓ *Key Action Statement 4; KAS Profile 4 on p. e270* If <u>broad-spectrum vs narrow-spectrum antibiotics</u> (especially the role of broad-spectrum antibiotics in promoting resistance and disrupting normal flora) is not understood or considered: ✓ CDC Antibiotic Resistance Threats in the United States, 2019 ✓ The Human Microbiome and Its Potential Importance to Pediatrics. If <u>true antibiotic allergies</u> and potential adverse events associated with the choice of antibiotic are not understood or considered: ✓ *Is it Really a Penicillin Allergy?* From the CDC	• Review the KCA, **Treat Infection Effectively**, for more information on this topic. • Survey the clinicians to ensure that every clinician has access to the guideline recommendations for treatment. • Conduct a Lunch-and=Learn or similar session with fellow clinicians to review ABS treatment recommendations using the guidelines and resources provided in this grid.

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	✓ Blumenthal KG, Peter JG, Trubiano JA, Phillips EJ. Antibiotic allergy. *Lancet.* 2019;393(10167):183-198 ✓ 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) ✓ *AAP News* article, Why's and how's of judicious antibiotic prescribing for URIs ✓ List of additional antibiotic allergy resources included in this EQIPP course. If the course of bacterial sinusitis and the occurrence of complications is not understood or considered: ✓ Table 4: *Management of Worsening or Lack of Improvement in 72 hours*, p. e276 in the AAP 2013 ABS Guideline. ✓ Thompson M, Vodicka TA, Blair PS, Buckley DI, Heneghan C, Hay AD; TARGET Programme Team. Duration of symptoms of respiratory tract infections in children: systematic review. *BMJ.* 2013;347: f7027 ✓ Use a diagnostic and treatment tool for sinusitis such as the Antibiotic Decision Making for ABS flowchart created for this course and make it available in examination rooms.	
Clinicians lack resources or are unsure how to deal with parental misconceptions or pressure about antibiotic use when the patient/family requests that antibiotics or a specific antibiotic be prescribed.	✓ Agree on, establish, and communicate a practice policy regarding prescription of the recommended antibiotic only, based on bacterial sinusitis clinical guidelines. ✓ Prepare to respond to parents' requests and inquiries with an explanation of the benefits of the recommended treatment with amoxicillin. ✓ Devote part of the visit flow to share with patient/family which antibiotic is recommended for treatment and why it is recommended. ✓ Establish practice policies that eliminate over-the-phone prescribing of antibiotics (ie, the diagnosis must be based on a physical examination). ✓ See *Table 3: Parent Information Regarding Initial Management of Acute Bacterial Sinusitis,* page e275 in the AAP 2013 ABS Guideline. ✓ Consult the Antibiotic Guidance and Education Checklist created for this course for a summary of key messages and key information to share with parents.	• 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. • Practice antibiotic stewardship in your practice, using these resources to guide your efforts:

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	✓ Use available resources to deal with parental misconceptions or pressure about antibiotic use:
	
	 ✓ HealthyChildren.org articles such as those referenced in the Patient and Family Antibiotic Information Resource List.
	
	 ✓ CDC's *Be Antibiotics Aware* Resources:
	   – Handouts
	   – Prescription Pads
	   – Social Media and Web Graphics
	   – Videos
	 ✓ AAP Pediatric Patient Education Online (requires subscription)
	   – Antibiotics—When Do They Help?
	   – Common Childhood Infections
	   – Sinusitis and Your Child
	 ✓ Distribute the Patient and Family Antibiotic Information Resource List created for this course.
	
	 ✓ Make selected resources available in examination rooms, on the practice Web site, or on the patient portal.
		✓ CDC's Core Elements of Antibiotic Stewardship
		
		 ✓ Antimicrobial stewardship in pediatrics: how every pediatrician can be a steward (Pubmed Abstract)
		
		 • Create a Judicious Use portal on your practice Web site with educational resources, including information on your practice's approach to common clinical infections.
		
		 • Enlist the antibiotic educator to locate related antibiotic resources suitable for your patient population.

Clinicians may not understand the impact of antibiotics on the course of ABS and on the occurrence of complications.	• Review the following: ✓ AAP 2013 ABS Guideline, especially Table 4: *Management of Worsening or Lack of Improvement in 72 hours,* p. e276 ✓ AAP 2021 Policy Statement Antibiotic Stewardship in Pediatrics ✓ Nonsevere and Severe Allergic Reactions • To help families understand the expected course of the illness, consult the Illness Duration Table and the Antibiotic Guidance and Education Checklist created for this course.	• Review the article, Thompson M, Vodicka TA, Blair PS, Buckley DI, Heneghan C, Hay AD; TARGET Programme Team. Duration of symptoms of respiratory tract infections in children: systematic review. *BMJ.* 2013;347:f7027

Appendix

Drug-Related Adverse Events

Possible adverse events may occur from antibiotic treatment. Some may require medical visits, additional tests, added cost, possible hospitalization, or even 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.

Non-severe 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*.

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

- Recommend pneumococcal conjugate vaccine to all children based on the schedule of the Advisory Committee on Immunization Practices of the CDC, AAP, and AAFP.
- Recommend annual influenza vaccine to all children according to schedule of the Advisory Committee on Immunization Practices of the CDC, AAP, and AAFP.

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- 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 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