

# A Practical Guide for Diagnosis and Treatment of sinusitis

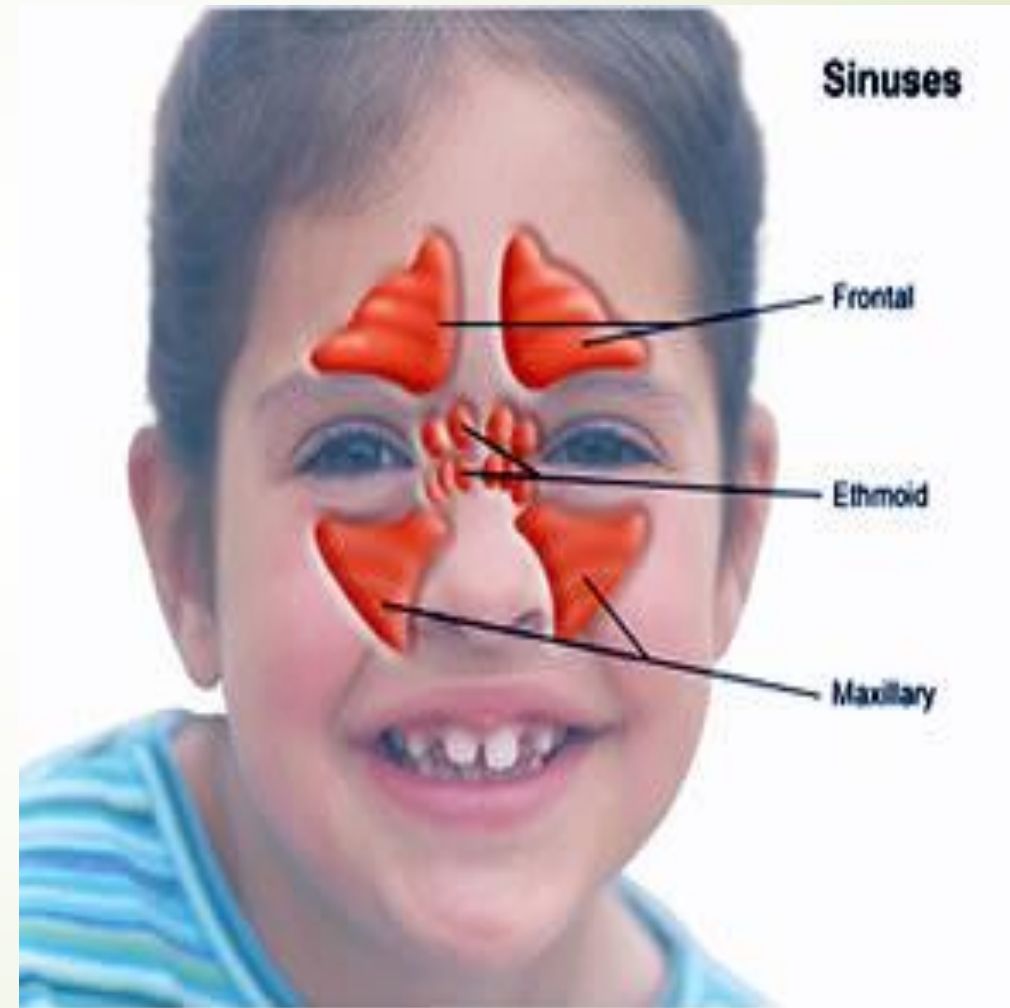


# Scope of Sinusitis

- ❑ Affects 30-35 million persons/year
- ❑ 25 million office visits/year
- ❑ Direct annual cost \$2.4 billion and increasing
- ❑ Added surgical costs: \$1 billion
- ❑ Third most common diagnosis for which antibiotics are prescribed

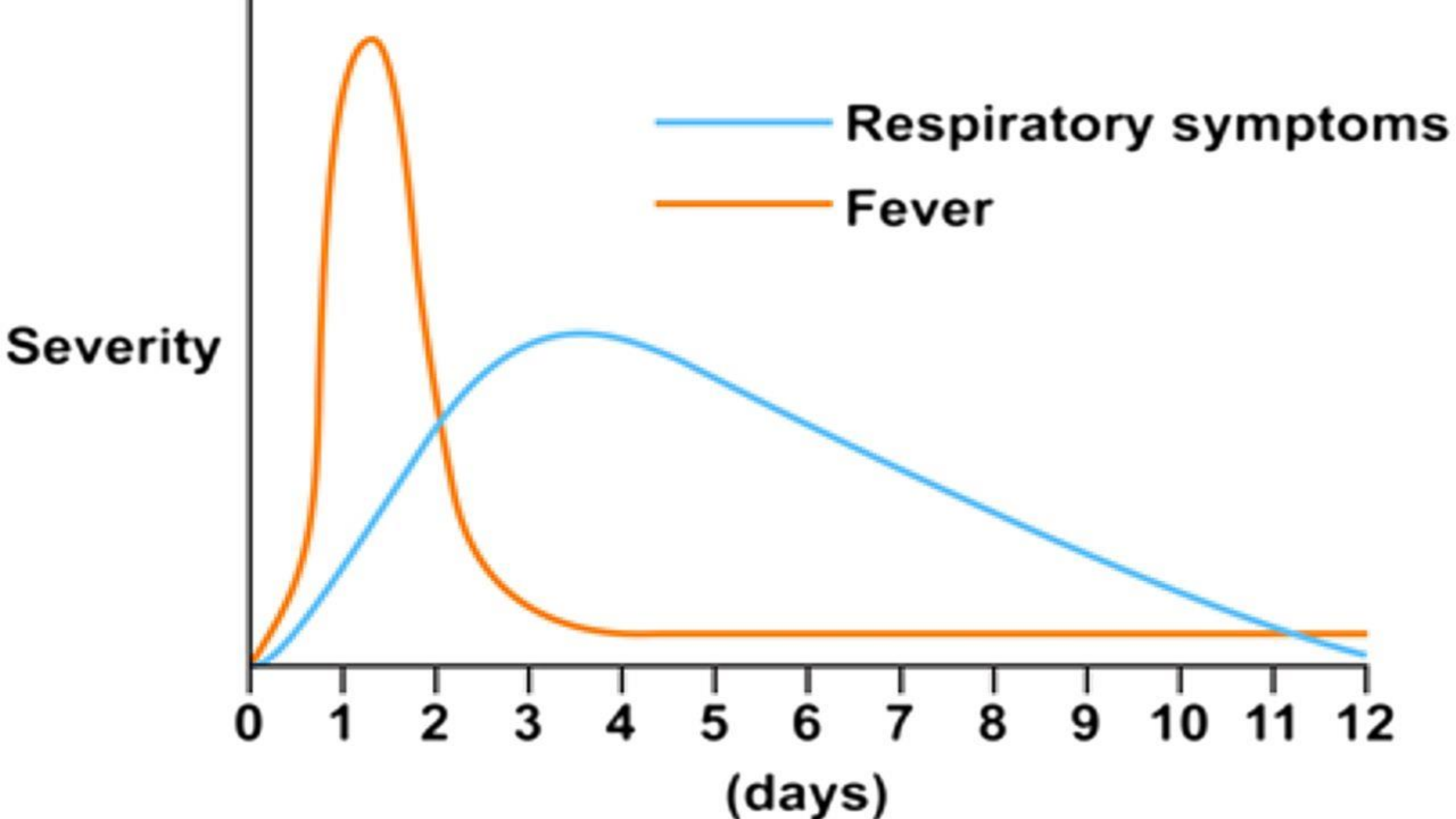
# Development of Sinuses


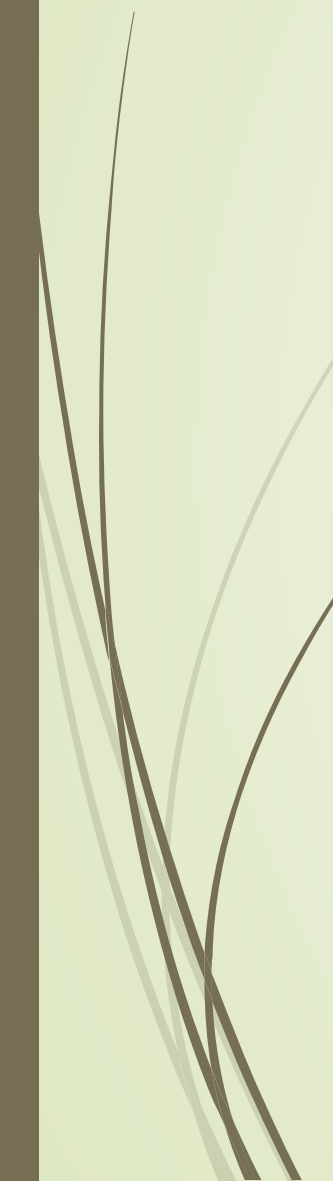
- ❑ Maxillary and ethmoid sinuses present at birth
- ❑ Frontal sinus developed by age 5 or 6
- ❑ Sphenoid sinus last to develop, 8-10





# Key Action Statement 1

- Clinicians should make a presumptive diagnosis of **acute bacterial sinusitis** when a child with an acute URI presents with the following:
- **Persistent illness**, ie, nasal discharge (of any quality) or daytime cough or both lasting more than 10 days without improvement;
- OR
- **Worsening course**, ie, worsening or new onset of nasal discharge, daytime cough, or fever after initial improvement;
- OR
- **Severe onset**, ie, concurrent fever (temperature  $\geq 39^{\circ}\text{C}/102.2^{\circ}\text{F}$ ) and purulent nasal discharge for at least 3 consecutive days .





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- Symptoms of **acute bacterial sinusitis** and uncomplicated **viral URI** overlap considerably, and therefore it is their **persistence** without improvement that suggests a diagnosis of acute sinusitis.
  - Such symptoms include **nasal discharge** (of any quality: thick or thin, serous, mucoid, or purulent) or **daytime cough** (which may be worse at night) or both. Bad breath, fatigue, headache, and decreased appetite, although common, are **not specific** indicators of acute sinusitis.






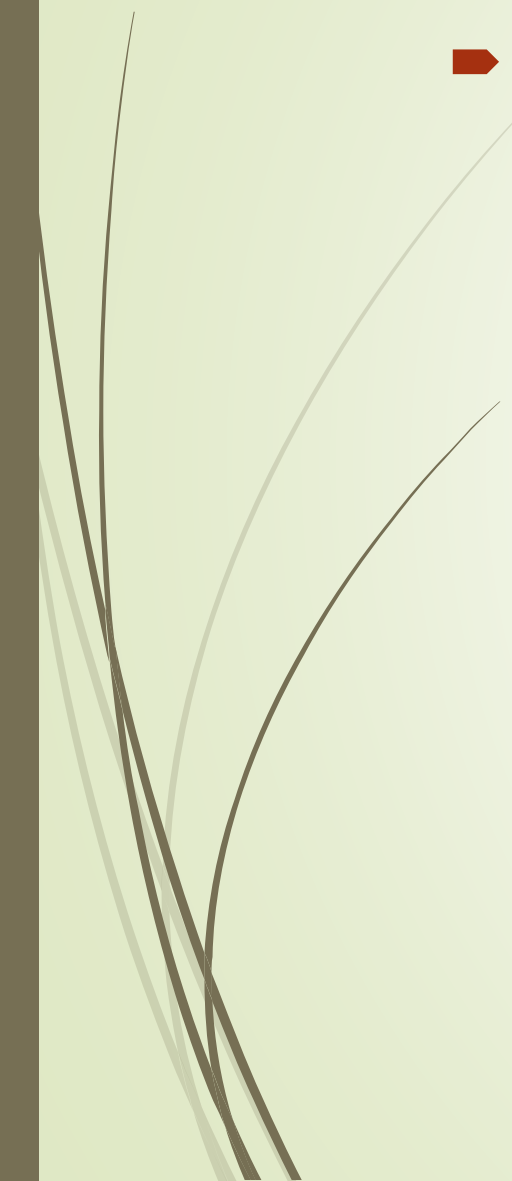
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- Physical examination findings are also **not** particularly helpful in distinguishing sinusitis from uncomplicated URIs. Erythema and swelling of the nasal turbinates are nonspecific findings.



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- Nasopharyngeal cultures do not reliably predict the etiology of acute bacterial sinusitis.



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- Only a minority (~6%–7%) of children presenting with symptoms of URI will meet criteria for persistence.
  - As a result, before diagnosing acute bacterial sinusitis, it is important for the practitioner to attempt to
  - (1) differentiate between sequential episodes of uncomplicated viral URI from the onset of acute bacterial sinusitis with persistent symptoms and
  - (2) establish whether the symptoms are clearly not improving.

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- ➡ A worsening course of signs and symptoms, termed “double sickening,” in the context of a viral URI is another presentation of acute bacterial sinusitis. Affected children experience substantial and acute worsening of respiratory symptoms (nasal discharge or nasal congestion or daytime cough) or a new fever, often on the sixth or seventh day of illness, after initial signs of recovery from an uncomplicated viral URI.

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- Finally, some children with acute bacterial sinusitis may present with **severe onset**, ie, concurrent high fever (temperature  $>39^{\circ}\text{C}$ ) and purulent nasal discharge.

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- it is the concurrent presentation of **high fever and purulent nasal discharge** for the first 3 to 4 days of an acute URI that helps to define the severe onset of acute bacterial sinusitis.
  - This presentation in children is the corollary to **acute onset of headache, fever, and facial pain in adults** with acute sinusitis.



## Key Action Statement 2A

- ➡ Clinicians **should not** obtain imaging studies (plain films, contrast-enhanced computed tomography [CT], MRI, or ultrasonography) to distinguish acute bacterial sinusitis from viral URI.

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- Accordingly, the most recent appropriateness criteria from the American College of Radiology endorse both **MRI** with contrast and contrast-enhanced **CT** as complementary examinations when evaluating **potential complications of sinusitis**.



## Key Action Statement 3

- *Initial Management of Acute Bacterial Sinusitis*
- **3A: “Severe onset and worsening course”** acute bacterial sinusitis. The clinician should prescribe antibiotic therapy for acute bacterial sinusitis in children with severe onset or worsening course (signs, symptoms, or both).





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- 3B: **“Persistent illness.”** The clinician should either prescribe antibiotic therapy **OR** offer additional outpatient observation for 3 days to children with persistent illness (nasal discharge of any quality or cough or both for at least 10 days without evidence of improvement) (Evidence Quality: B; Recommendation).

TABLE 2

Recommendations for Initial Use of Antibiotics for Acute Bacterial Sinusitis

Clinical Presentation	Severe Acute Bacterial Sinusitis <sup>a</sup>	Worsening Acute Bacterial Sinusitis <sup>b</sup>	Persistent Acute Bacterial Sinusitis <sup>c</sup>
Uncomplicated acute bacterial sinusitis without coexisting illness	Antibiotic therapy	Antibiotic therapy	Antibiotic therapy or additional observation for 3 days <sup>d</sup>
Acute bacterial sinusitis with orbital or intracranial complications	Antibiotic therapy	Antibiotic therapy	Antibiotic therapy
Acute bacterial sinusitis with coexisting acute otitis media, pneumonia, adenitis, or streptococcal pharyngitis	Antibiotic therapy	Antibiotic therapy	Antibiotic therapy

- <sup>a</sup> Defined as temperature  $\geq 39^{\circ}\text{C}$  and purulent (thick, colored, and opaque) nasal discharge present concurrently for at least 3 consecutive days.
- <sup>b</sup> Defined as nasal discharge or daytime cough with sudden worsening of symptoms (manifested by new-onset fever  $\geq 38^{\circ}\text{C}/100.4^{\circ}\text{F}$  or

TABLE 3

Parent Information Regarding Initial Management of Acute Bacterial Sinusitis

How common are sinus infections in children?	Thick, colored, or cloudy mucus from your child’s nose frequently occurs with a common cold or viral infection and does not by itself mean your child has sinusitis. In fact, fewer than 1 in 15 children get a true bacterial sinus infection during or after a common cold.
How can I tell if my child has bacterial sinusitis or simply a common cold?	Most colds have a runny nose with mucus that typically starts out clear, becomes cloudy or colored, and improves by about 10 d. Some colds will also include fever (temperature >38°C [100.4°F]) for 1 to 2 days. In contrast, acute bacterial sinusitis is likely when the pattern of illness is persistent, severe, or worsening.
	1. <i>Persistent</i> sinusitis is the most common type, defined as runny nose (of any quality), daytime cough (which may be worse at night), or both for at least 10 days without improvement.
	2. <i>Severe</i> sinusitis is present when fever (temperature ≥39°C [102.2°F]) lasts for at least 3 days in a row and is accompanied by nasal mucus that is thick, colored, or cloudy.
	3. <i>Worsening</i> sinusitis starts with a viral cold, which begins to improve but then worsens when bacteria take over and cause new-onset fever (temperature ≥38°C [100.4°F]) or a substantial increase in daytime cough or runny nose.
If my child has sinusitis, should he or she take an antibiotic?	Children with <i>persistent</i> sinusitis may be managed with either an antibiotic or with an additional brief period of observation, allowing the child up to another 3 days to fight the infection and improve on his or her own. The choice to treat




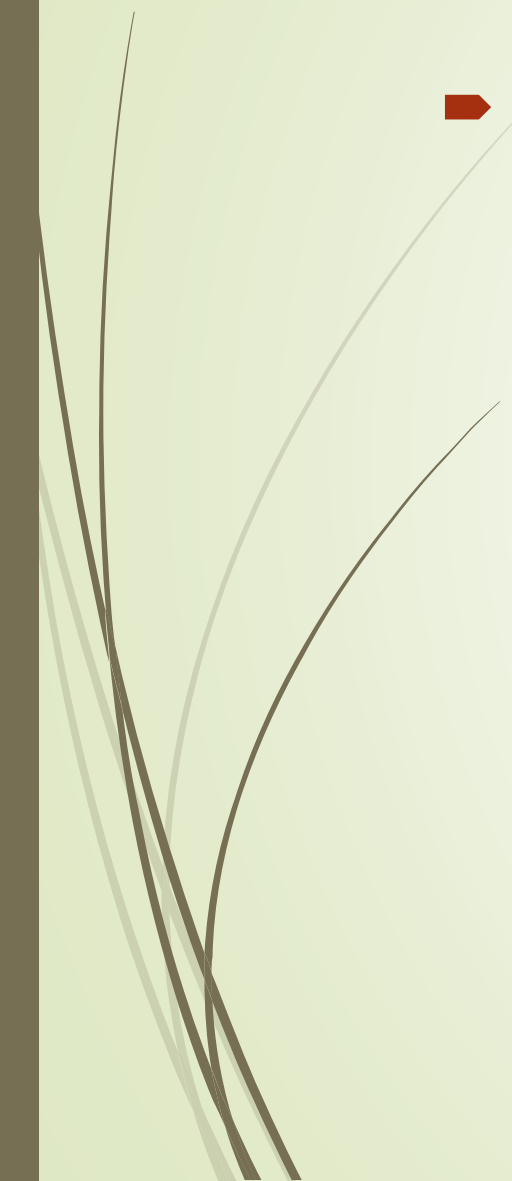
## Key Action Statement 4


- Clinicians should prescribe **amoxicillin with or without clavulanate** as first-line treatment when a decision has been made to initiate antibiotic treatment of acute bacterial sinusitis.



## The major bacterial pathogens recovered

- *Streptococcus pneumoniae* in approximately 30%
- nontypeable *Haemophilus influenza* 20%
- *Moraxella catarrhalis* in approximately 20%
- Aspirates from the remaining 25% to 30% of children were sterile.



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- Although *S aureus* is a very infrequent cause of acute bacterial sinusitis in children, it is a significant pathogen in the orbital and intracranial complications of sinusitis. The reasons for this discrepancy are unknown.


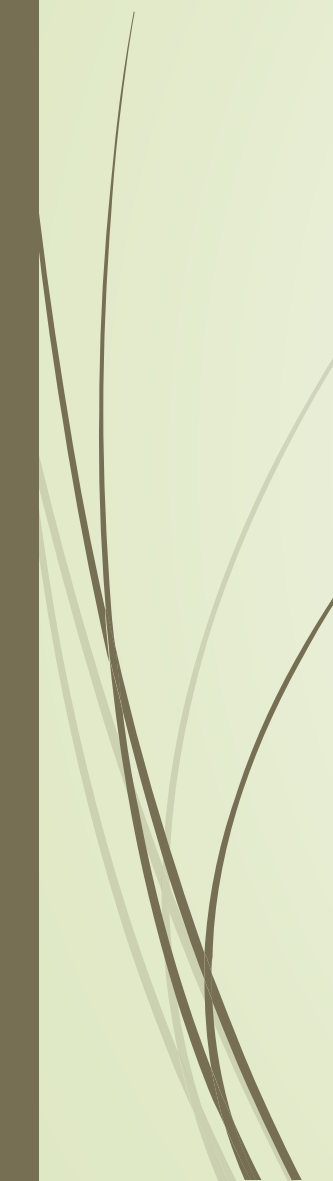




**Amoxicillin** remains the antimicrobial agent of choice for first-line treatment of uncomplicated acute bacterial sinusitis in situations in which antimicrobial **resistance is not suspected**.



- Risk factors for the presence of organisms likely to be **resistant to amoxicillin** include
  - attendance at child care,
  - receipt of antimicrobial treatment within the previous 30 days,
  - age younger than 2 years.
- In communities with a high prevalence of nonsusceptible *S. pneumoniae*, treatment may be initiated **at 80 to 90** mg/kg per day in 2 divided doses, with a maximum of 2 g per dose in adult.



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- Patients presenting with moderate to severe illness as well as those younger than 2 years, attending child care, or who have recently been treated with an antimicrobial may receive high-dose amoxicillin-clavulanate (80–90 mg/kg per day of the amoxicillin component with 6.4 mg/kg per day of clavulanate in 2 divided doses with a maximum of 2 g per dose). The potassium clavulanate levels are adequate to inhibit all  $\beta$ -lactamase-producing *H influenzae* and *M catarrhalis*.

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- A single **50-mg/kg dose of ceftriaxone** can be used for children who are vomiting, unable to tolerate oral medication, or unlikely to be adherent to the **initial doses** of antibiotic
  - If clinical improvement is observed at 24 hours, **an oral antibiotic can be substituted to complete the course of therapy.** Children who are still significantly febrile or symptomatic at 24 hours may require **additional parenteral doses** before switching to oral therapy.

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- Pneumococcal and *H influenzae* surveillance studies have indicated that resistance of these organisms to trimethoprim-sulfamethoxazole and azithromycin is sufficient to preclude their use for treatment of acute bacterial sinusitis in patients with penicillin hypersensitivity

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- The **optimal duration** of antimicrobial therapy for patients with acute bacterial sinusitis has not received systematic study. Recommendations based on clinical observations have varied widely, from **10 to 28 days** of treatment. An alternative suggestion has been made that antibiotic therapy be continued for **7 days after the patient becomes free of signs and** minimum course of 10 days



# Key Action Statement 5A

- Clinicians should **reassess initial management** if there is either a caregiver report of worsening (progression of initial signs/symptoms or appearance of new signs/symptoms) OR failure to improve (lack of reduction in all presenting signs/symptoms) within 72 hours of initial management.

## Key Action Statement 5B

If the diagnosis of acute bacterial sinusitis is confirmed in a child with worsening symptoms or failure to improve in 72 hours

- clinicians may **change** the antibiotic therapy for the child initially managed with antibiotic **OR**
- **initiate** antibiotic treatment of the child initially managed with observation.

**TABLE 4**

Management of Worsening or Lack of Improvement at 72 Hours

Initial Management	Worse in 72 Hours	Lack of Improvement in 72 Hours
Observation	Initiate amoxicillin with or without clavulanate	Additional observation or initiate antibiotic based on shared decision-making
Amoxicillin	High-dose amoxicillin-clavulanate	Additional observation or high-dose amoxicillin-clavulanate based on shared decision-making
High-dose amoxicillin-clavulanate	Clindamycin <sup>a</sup> and cefixime OR linezolid and cefixime OR levofloxacin	Continued high-dose amoxicillin-clavulanate OR clindamycin <sup>a</sup> and cefixime OR linezolid and cefixime OR levofloxacin


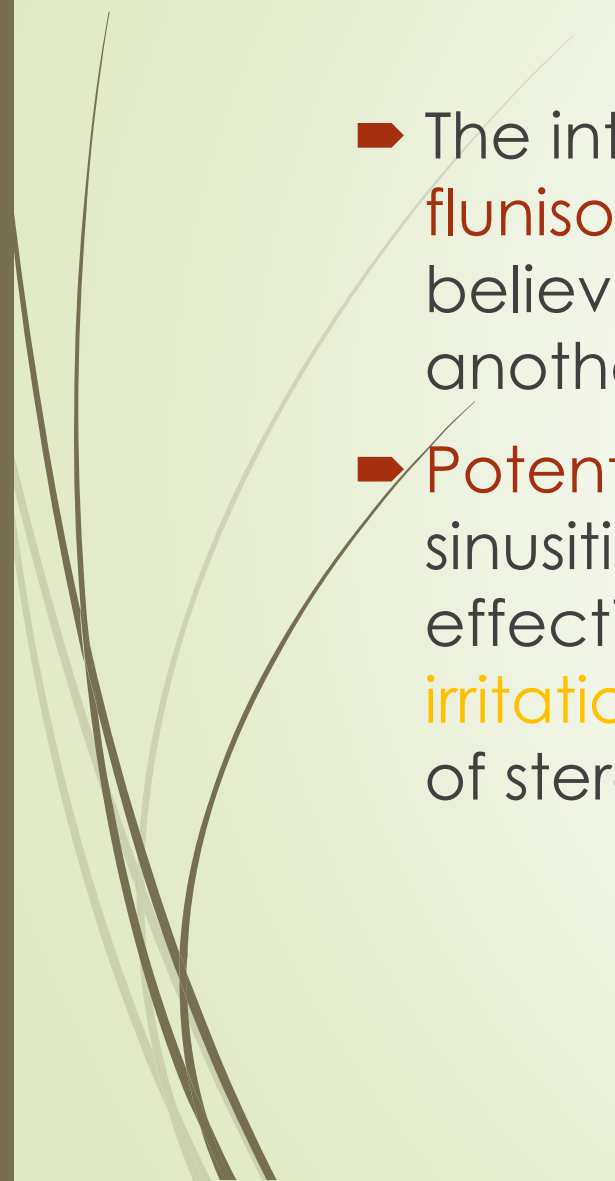
- <sup>a</sup>Clindamycin is recommended to cover penicillin-resistant *S pneumoniae*. Some communities have high levels of clindamycin-resistant *S pneumoniae*. In these communities, linezolid is preferred.



# Adjuvant Therapy

- Potential adjuvant therapy for acute sinusitis might include intranasal corticosteroids,
- saline nasal irrigation or lavage,
- topical or oral decongestants,
- mucolytics,
- topical or oral antihistamines.



A recent Cochrane review on decongestants, antihistamines, and nasal irrigation for acute sinusitis in children found **no** appropriately designed studies to determine the effectiveness of these interventions.

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- The intranasal steroids studied to date include **budesonide, flunisolide, fluticasone, and mometasone**. There is no reason to believe that one steroid would be more effective than another, provided equivalent doses are used.
  - **Potential harm** in using nasal steroids in children with acute sinusitis includes the increased cost of therapy, difficulty in effectively administering nasal sprays in young children, **nasal irritation and epistaxis**, and potential systemic adverse effects of steroid use.



# *Saline Irrigation*

- **Saline nasal irrigation or lavage** (not saline nasal spray) has been used to remove debris from the nasal cavity and temporarily reduce tissue edema (hypertonic saline) to promote drainage from the sinuses.

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- Data are insufficient to make any recommendations about the use of oral or topical nasal decongestants, mucolytics, or oral or nasal spray antihistamines as adjuvant therapy for acute bacterial sinusitis in children .
  - Antihistamines should not be used for the primary indication of acute bacterial sinusitis in any child, although such therapy might be helpful in reducing typical allergic symptoms in patients with atopy who also have acute sinusitis.



