Children's Hospital and Health System, Inc.
Patient Care Treatment Guideline
CW Urgent Care

SUBJECT: Acute Bacterial Rhinosinusitis (ABRS)

Patient meets one of the three clinical criteria for diagnosis of acute sinusitis:
- Persistent AND not improving (≥10 days) OR
- Severe (≥ 3-4 days) OR
- Worsening course (worsening or new onset nasal discharge, daytime cough or fever after initial improvement)

Assess Clinical Severity Score (Figure A)

Severe disease: Clinical Severity Score ≥ 8

Mild to moderate disease: Clinical Severity Score < 8

Initiate treatment with **TIER 2** antibiotic (Figure C)

Assess risk for antibiotic resistance:
- Age <2
- Daycare attendance
- Prior antibiotics within the last month
- Prior hospitalization within the past 5 days
- Unimmunized or under-immunized with PCV-13

YES risks of antibiotic resistance

Initiate treatment with **TIER 2** antibiotic (Figure C)

Advise reassessment and broaden coverage or switch to different antimicrobial class if worsening or not improving after 3 full days (72 hours) of treatment.

No risks of antibiotic resistance

Initiate treatment with **TIER 1** antibiotic (Figure B)

Advise reassessment/consider broadening coverage to **TIER 2** antibiotic if worsening or not starting to improve after 3 full days (72 hours) of treatment.

Figure A: Clinical Severity Score

Symptom or sign	Points
Abnormal nasal or postnasal discharge	
Minimal	1
Severe	2
Nasal Congestion	1
Cough	2
Malodorous breath	1
Facial tenderness	3
Erythematous nasal mucosa	1
Fever < 38.5 °C	1
Fever ≥ 38.5 °C	2
Severe headache (retro-orbital) or irritability	3
Mild headache	1

Figure B: TIER 1 antibiotics (mild to moderate disease AND no risk factors for antibiotic resistance):
- No Penicillin allergy:
  - Amoxicillin 45 mg/kg/day divided BID for 10 days (max dose 1000 mg BID)
- Low risk Penicillin allergy choose either:
  - Cefdinir 14 mg/kg/day divided BID or 300 mg capsule BID for 10 days (max dose 300 mg BID)
  - Cefpodoxime 10 mg/kg/day divided BID or 200 mg capsule BID for 10 days (max dose 200 mg BID)
    - Cefpodoxime suspension is quite expensive, so consider Cefdinir for patients that cannot swallow a pill. Overall, Cefpodoxime has a better pharmacokinetic profile and may be a better alternative for patients old enough to not need suspension.
- High risk* Penicillin allergy choose either:
  - Levofloxacin
    - < 5 years age 20 mg/kg/day divided BID for 10 days or 250 mg BID (max dose 250 mg BID)
    - ≥ 5 years age 10 mg/kg/day once daily for 10 days or 500 mg capsule once daily (max dose 500 mg once daily)
  - Doxycycline monohydrate 4.4 mg/kg/day divided BID or 100 mg capsule bid (max dose 100 mg BID) for 10 days
    - The 2018 AAP Red Book states that doxycycline can be used for short durations (i.e., 21 days or less) in pediatric patients of all ages.

Figure C: TIER 2 antibiotics (severe disease OR risk factors for antibiotic resistance):
- No Penicillin allergy:
  - Amoxicillin/clavulanate 90 mg/kg/day divided BID for 10 days
    - Use 600 mg/5 ml suspension, max dose 2000 mg per dose BID
    - For capsule, use Augmentin 875 mg, 1 capsule BID
      - Note: For patients at significantly increased risk of resistant *strep pneumo* (i.e., unimmunized or asplenic), recommend Augmentin XR 1000 mg caps, dose is 2000 mg per dose BID. This medication is difficult to find, consider calling pharmacy to ensure availability or use Augmentin ES suspension, 2000 mg per dose BID if the child is willing to take a suspension.
- Low risk Penicillin allergy choose either:
  - Cefdinir 14 mg/kg/day divided BID or 300 mg capsule BID for 10 days (max dose 300 mg BID)
  - Cefpodoxime 10 mg/kg/day divided BID or 200 mg capsule BID for 10 days (max dose 200 mg BID)
    - Cefpodoxime suspension is quite expensive, so consider Cefdinir for patients that cannot swallow a pill. Overall, Cefpodoxime has a better pharmacokinetic profile and may be a better alternative for patients old enough to not need suspension.
- High risk* Penicillin allergy choose either:
  - Levofloxacin
    - < 5 years age 20 mg/kg/day divided BID for 10 days or 250 mg BID (max dose 250 mg BID)
    - ≥ 5 years age 10 mg/kg/day once daily for 10 days or 500 mg capsule once daily (max dose 500 mg once daily)
  - Doxycycline monohydrate 4.4 mg/kg/day divided BID or 100 mg capsule bid (max dose 100 mg BID) for 10 days
    - The 2018 AAP Red Book states that doxycycline can be used for short durations (i.e., 21 days or less) in pediatric patients of all ages.

For patients who are vomiting and do not have a high risk Penicillin allergy: A dose of Ceftriaxone 50 mg/kg per day (maximum dose 1 g/day) intramuscularly (IM) can be used once daily until patient is able to tolerate oral antibiotic. Therapy with an oral antibiotic should be initiated 24 hours following final dose of Ceftriaxone to complete 10 total days of antibiotic therapy.

*High risk Penicillin allergy includes: anaphylaxis, mouth blisters, hypotension, seizure, peeling skin, syncope, swelling (face, lips, throat), wheezing

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Purpose: To evaluate and initiate treatment of ABRS. *The diagnosis and management of sinusitis is unclear and at times controversial; the purpose of this guideline is to create clarity and standardization within CW Urgent Care.*

Definition: ABRS is a secondary bacterial infection. Preceding primary conditions include: viral upper respiratory infection (URI), allergic rhinitis, anatomic obstructing conditions, nasal dryness, dental issues, local irritation, immunodeficiency and sudden change in atmospheric pressure. It is estimated that less than 2% of acute sinusitis cases are likely bacterial, although as many as 92% of patients receive antibiotics.

Etiology: ABRS occurs when the mucosa of one or more of the paranasal sinuses becomes inflamed by a primary condition (identified above). This inflammation results in obstruction of the sinus ostia due to mucosal edema and impaired function of ciliary transport. The ostia obstruction and slow mucous transport causes stagnation of secretions and lowered oxygen tension within the sinuses creating an environment that is an excellent culture medium for both viruses and bacteria. The bacterial types most commonly involved in ABRS include: *Streptococcus pneumonia, Haemophilus influenza, and Moraxella catarrhalis. Staphylococcus aureus has also been recovered from sinus aspirates in some studies. As the incidence of immunization against Streptococcus pneumonia has increased, the proportion of acute sinusitis due to S. pneumonia has felt to be decreasing, with a resultant increase in the proportion of acute sinusitis due to non-typeable Haemophilus influenza and Moraxella catarrhalis.*

Differential Diagnosis

- Viral URI
- Viral rhinosinusitis
- Allergic rhinitis
- Influenza or other viral infection
- Fungal sinus infection (rare)

Guideline

ABRS is a presumptive diagnosis based on the patient's symptoms and illness course. There are three distinct clinical presentations of acute sinusitis in children: persistent illness, worsening course, and severe onset.

1. **Persistent illness,** i.e., nasal discharge (of any quality) or daytime cough or both lasting more than 10 days without improvement: *Only a small percentage (~6%–7%) of children presenting with symptoms of URI will meet criteria for persistent illness. A detailed history is especially important in making this diagnosis. The clinician must ensure that symptoms are not due to back to back URI's (which may seem to coalesce in the mind of the patient or parent into one long illness). In*

addition to having persistent symptoms from one single illness, those symptoms also need to be clearly not improving.

2. **Worsening course,** i.e., worsening or new onset of nasal discharge, daytime cough, or fever after initial improvement: *A worsening course is sometimes called "double sickening" because patients start to improve and then worsen. Typical presentation for this type of sinusitis is substantial, acute worsening of either respiratory symptoms (nasal discharge, nasal congestion, or daytime cough) or a new fever. These symptoms begin often on the* ***sixth or seventh day of illness****, after initial signs of recovery from a typical, uncomplicated URI.*

3. **Severe onset,** i.e., concurrent fever (temperature ≥39°C/102.2°F) and purulent nasal discharge for at least 3 consecutive days: *Some children with acute bacterial sinusitis may present with severe onset, i.e., concurrent high fever (temperature >39°C for at least 3 days in a row) along with purulent nasal discharge occurring at the same time. These children usually are ill appearing and need to be distinguished from children with viral infections that present with fever. One distinguishing feature is that typical viral infections do not have purulent nasal drainage occurring at the same time as the high fever (in viral infections the fever typically improves before the purulent nasal drainage begins).*

Objective Data/Physical Exam

- ***Physical exam findings do NOT distinguish a viral URI from ABRS; consider patient's presenting history especially the duration, symptom pattern and severity of symptoms when making a diagnosis of ABRS.***
- The following are NOT specific to ABRS:
    - Erythema and swelling of the turbinates
    - Tenderness to percussion of the sinuses
    - Decreased transillumination of the sinuses
    - Halitosis
    - Headache
    - Decreased appetite
    - Dental pain
    - Fatigue
    - Quality of nasal discharge (clear vs colored)

Diagnostic Studies

- Imaging studies of any kind are NOT indicated to confirm the diagnosis.
- Nasopharyngeal or throat culture should NOT routinely be obtained. There is a poor correlation between the bacteria found and the cause of the disease; a negative culture does not rule out ABRS.
    - CW Lab will not accept nasal drainage for culture.

- CW ENT may consider sinus culture in patients with chronic sinusitis.

Complications of acute sinusitis:

- The most common complication of acute bacterial rhinosinusitis is orbital involvement in children with ethmoid sinusitis. Consider/suspect orbital involvement in children under age 5 presenting with a swollen eye, especially if accompanied by proptosis or impaired extraocular muscle movement.
- Intracranial complications are rare but serious, and may include septic cavernous sinus thrombosis, osteomyelitis of the frontal bone, or abscess (subperiosteal, epidural, subdural or brain). Consider/suspect intracranial complications in patients with severe headache, photophobia, seizures or other focal neurologic findings.
- If there is a concern for a complication of acute sinusitis, patient should be transferred to the ED for additional diagnostic evaluation and treatment.

Treatment (See appendix: Sinusitis Treatment Algorithm)

1. Decision to treat with antibiotics: decision will vary based on which of the three clinical presentations of ABRS is present, as well as disease severity and underlying risk factors.
    a. For children with ABRS diagnosed based on either *severe* or *worsening symptoms* initiate antimicrobial therapy at the time of presentation.
    b. For children with ABRS based on *duration of symptoms* who present with 10 days of symptoms that are neither severe nor worsening, and none of the indications for immediate antimicrobial therapy listed below, consider either immediate antimicrobial therapy or a three-day period of observation, depending upon patient and family preference.
        i. Consider immediate antimicrobial therapy if the patient:
            1. Was on antibiotics in the previous four weeks
            2. Has another concurrent bacterial infection (pneumonia, cervical lymphadenitis, strep throat, acute otitis media)
            3. Has a suspected complication of ABRS
            4. Has an underlying condition like asthma, cystic fibrosis, immunodeficiency, previous sinus surgery, or anatomic abnormalities of the upper respiratory tract.
        ii. Additional factors that should be considered in this decision to treat immediately vs. observe for 72 hours include:
            1. Severity of symptoms
            2. Quality of life (interfering with sleep or ability to attend school)
            3. Past history of ABRS
            4. Cost and ease of administration of antibiotics
            5. Concerns about adverse effects of antibiotics or development of complications.

2. Choice of antibiotic: consider severity of disease as well as risk factors for antimicrobial resistance when choosing initial antibiotic selection. If sinusitis symptoms meet the definition

of severe disease, or the patient has risk factors for antimicrobial resistance, then an antibiotic with improved coverage of resistant *S. pneumoniae* and *H. influenzae* would be indicated.

a. **Clinical Severity Score**: Use the clinical severity score to determine which patients should receive more aggressive, broad spectrum antibiotic therapy. To utilize, assess signs and symptoms within 24 hours of presentation, observed or according to history and documented with thermometer, not just tactile fever.

A score ≥ 8 indicates severe disease:

Symptom or sign	**Points**
Abnormal nasal or postnasal discharge	
Minimal	1
Severe	2
Nasal Congestion	1
Cough	2
Malodorous breath	1
Facial tenderness	3
Erythematous nasal mucosa	1
Fever < 38.5 °C	1
Fever ≥ 38.5 °C	2
Severe headache (retro-orbital) or irritability	3
Mild headache	1

b. Consider **risk factors** for resistant *S. pneumoniae* and *H. influenzae* that require high dose amoxicillin/clavulanate including:
   i. Living in an area with high endemic rates (ie, ≥10 percent) of invasive penicillin-nonsusceptible S. pneumoniae
   ii. Age <2 years
   iii. Daycare attendance
   iv. Antibiotic therapy within the month prior to presentation
   v. Hospitalization within the past 5 days
   vi. Unimmunized or underimmunized with PCV13

3. Adjuvant therapy: *Current AAP Acute Sinusitis Guidelines make no recommendation for or against adjuvant therapy due to lack of well-designed studies to determine effectiveness.*
   a. Nasal saline (has potential benefit of thinning the nasal secretions)
      i. Gentle saline mist with or without suction (i.e. Nose Frida or Graco Battery Powered Suction)
      ii. Neti pot or NeilMed rinse bottle, use distilled water or saline
   b. Afrin
      i. In children six and older: 1 spray to each nostril BID
      ii. Limit use to a maximum of 3 days only due to refractory congestion

iii. Follow with liberal use of nasal distilled water or saline irrigation 15-20 minutes after Afrin application

c. Intranasal steroids
    i. Recommended if the patient has an underlying allergic component, chronic or recurrent sinusitis, or history of prior intranasal steroid use
    ii. If previously prescribed, make sure the patient is using consistently
    iii. Helps limit reoccurrence of primary conditions but will not provide immediate relief of current symptoms

d. Antihistamines
    i. Only recommended if the patient has an underlying allergic component
    ii. Helps limit reoccurrence of primary conditions but will not provide immediate relief of current symptoms

e. Decongestants
    i. Oral decongestants have not been shown to be effective in children under 12 years of age
    ii. May consider use of pseudoephedrine in adolescents

Refer to CW Urgent Care Evidence Based Guideline, "Use of Pharmacologic Agents in the Treatment of Cough and Cold Symptoms in Children" for more details.

Education of Patient/Family

- Adjuvant therapy as described above
- Encourage fluids
- Acetaminophen and/or NSAID for comfort

Follow-up

- Recheck by PMD if no better in 3 days (72 hours) OR if not symptom free for at least 7 days on the antibiotic.
    - If no improvement in 3 days (72 hours), consider treatment failure and broaden coverage or switch to a different antimicrobial class.
    - If some improvement but not full resolution, consider extending the course of the same antibiotic.
- Consider referral to CHW ENT:
    - Patient on ≥ 3 courses of antibiotics without symptom improvement
    - 4-5 episodes of ABRS per year
- Patients with suspected complications of ABRS should receive additional evaluation/treatment that is beyond the scope of this guideline.

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This guideline is designed to serve as a reference for clinical practice and does not represent an exclusive course of treatment nor does it serve as a standard of medical care. Providers should apply their professional judgment to the management of individual patient conditions and circumstances. Children's Hospital and Health System (CHHS) does not make any representation with respect to any sort of industry recognized standard of care for the particular subject matter of this clinical guideline. Additionally, CHHS form documents are subject to change, revision, alteration, and/or revocation without notice.

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