

This optimal usage guide is mainly intended for primary care health professionals. It is provided for information purposes only and should not replace the clinician's judgement. The recommendations were developed using a systematic approach and are supported by the scientific literature and the knowledge and experience of Quebec clinicians and experts. For more details, go to inesss.qc.ca.

GENERAL INFORMATION

IMPORTANT CONSIDERATIONS

- ▶ **Most of Rhinosinusitis cases are viral and resolve spontaneously.**
- ▶ Children contract 6 upper respiratory tract infections (URTIs) per year, on average, and they last from 7 to 10 days, but can persist to 14 days.
- ▶ Approximately 5 % of URTIs develop into acute bacterial rhinosinusitis.
- ▶ Antibiotic treatment should be given only for acute bacterial rhinosinusitis.
- ▶ **Risk factors** of *Streptococcus pneumoniae* resistance :
 - Daycare attendance
 - Children < 2 years of age
 - Recent hospitalization
 - Recent antibiotic treatment (< 30 days)

Bacterial pathogens most frequently associated with acute bacterial rhinosinusitis

- | | |
|--|---------------------------------|
| ▶ <i>Streptococcus pneumoniae</i> | ▶ <i>Moraxella catarrhalis</i> |
| ▶ Non-typeable <i>Haemophilus influenzae</i> | ▶ <i>Streptococcus pyogenes</i> |

PREVENTIVE MEASURES

- ▶ Living in a smoke-free environment
- ▶ Practising daily nasal hygiene – increase frequency when suffering from URTIs
- ▶ Following the recommended vaccination schedule under the Québec Immunisation Program

DIAGNOSIS

Bacterial rhinosinusitis symptoms overlap with those of viral rhinosinusitis.

Diagnosis is based on one of the following three clinical situations :

- ▶ Persisting symptoms for 10 to 14 days without improvement :
 - Purulent rhinorrhea OR
 - Daytime cough that may increase at night
- ▶ Symptoms worsening after 5 to 7 days following initial improvement (biphasic infection) :
 - Purulent rhinorrhea OR
 - Persistent daytime cough OR
 - Temperature $\geq 38^{\circ}\text{C}$
- ▶ Severe symptoms for at least 3 days in a row :
 - Temperature $\geq 39^{\circ}\text{C}$ AND
 - Purulent rhinorrhea

If there is significant impairment of the general condition, edema / peri-orbital redness or impairment of the central nervous system, complications must be considered (urgent consultation in hospital).

RADIOGRAPHY

- ▶ Sparsely useful :
 - To distinguish viral infections from bacterial infections in children
 - In cases of rhinosinusitis without complications
- ▶ If X-ray is used, thickening of the mucosa alone is not a criterion of acute rhinosinusitis.

TREATMENT PRINCIPLES

SUPPORTIVE TREATMENTS

- ▶ Pain and fever can be treated with an analgesic/antipyretic (acetaminophen or ibuprofen*) within the first few days.
- ▶ A nasal saline solution used for irrigation helps relieve symptoms.
- ▶ Topical corticosteroid use is generally not recommended but can have a modest effect on rhinosinusitis symptoms.
- ▶ Neither decongestants nor antihistamines have proven useful in treating acute rhinosinusitis in children.

*Ibuprofen is not recommended for children under 6 months of age.

HISTORY OF ALLERGIC REACTION TO A PENICILLIN ANTIBIOTIC

- ▶ True penicillin allergy is uncommon. For 100 children with a history of penicillin allergy fewer than 6 will be **CONFIRMED** to have a true diagnosis of allergy and the reactions will be mostly delayed non-severe rashes.
 - It is therefore important to carefully assess the allergy status of a patient who reports a history of allergic reaction to penicillin, before considering using alternatives to beta-lactams. For help, consult [the decision-making tool in case of allergy to penicillins](#).

ANTIBIOTIC THERAPY

The first-line antibiotic treatment for rhinosinusitis is high-dose (90 mg/kg/day) amoxicillin :


- ▶ Helps achieve therapeutic concentrations in the sinuses for the treatment of pneumococci intermediately resistant to penicillin and of most highly penicillin-resistant pneumococci
- ▶ Generally well tolerated by children

However, in children who present no [risk factors](#) for resistance, amoxicillin 45 mg/kg/day, three times daily, can be considered.



**ACUTE RHINOSINUSITIS
IN CHILDREN**

- Optimal treatment duration has not been determined in pediatrics : experts recommend 10 to 14 days of antibiotic treatment, including at least 5 days after symptoms resolution.

FIRST-LINE ANTIBIOTIC TREATMENT FOR ACUTE BACTERIAL RHINOSINUSITIS			
	Antibiotic	Daily dosage	Maximum dosage
	Amoxicillin	90 mg/kg/day PO ÷ BID	2 000 mg PO BID
If antibiotics have been used within the past 30 days	Amoxicillin-Clavulanate ¹ (7:1 formulation) Or Amoxicillin + Amoxicillin-Clavulanate ¹ (7:1 formulation)	90 mg/kg/day PO ÷ BID Or 45 mg/kg/day PO ÷ BID + 45 mg/kg/day PO ÷ BID	1 500 mg PO BID Or 750 mg PO BID + 750 mg PO BID
If history of allergic reaction to a penicillin antibiotic	Click here  to view the acute bacterial rhinosinusitis in children algorithm for help in choosing an antibiotic therapy.		

- In the case where no response is observed after 48 to 72 hours of treatment and before starting second-line treatment :
 - Verify acceptability and adherence to treatment.

SECOND-LINE ANTIBIOTIC TREATMENT FOR ACUTE BACTERIAL RHINOSINUSITIS				
		Antibiotic	Daily dosage	Maximum dosage
Antibiotic treatment in the event that treatment fails after 48 to 72 hours	If amoxicillin fails	Amoxicillin-Clavulanate ¹ (7:1 formulation) Or Amoxicillin + Amoxicillin-Clavulanate ¹ (7:1 formulation)	90 mg/kg/day PO ÷ BID Or 45 mg/kg/day PO ÷ BID + 45 mg/kg/day PO ÷ BID	1 500 mg PO BID Or 750 mg PO BID + 750 mg PO BID
	If amoxicillin-clavulanate fails	Reassess diagnosis; Check for complications; Consider referral to a specialist.		

1. The 7:1 formulation (BID) of amoxicillin-clavulanate is preferred due to its higher digestive tolerance. The 200 mg/5 ml and 400 mg/5 ml formulations and 875 mg tablets contain the correct ratio of amoxicillin and clavulanic acid. Some clinicians use a combination of amoxicillin (45 mg/kg/day) and amoxicillin-clavulanate (7:1 formulation) (45 mg/kg/day) to reduce adverse effects (total of 90 mg/kg/day, 14:1 equivalent); volumes of amoxicillin and amoxicillin-clavulanate to be given could be different.

MAIN REFERENCES

Chow AW, Benninger MS, Brook I, Brozek JL, Goldstein EJ, Hicks LA, et al. "IDSA clinical practice guideline for acute bacterial rhinosinusitis in children and adults." *Clin Infect Dis* 2012;54(8):e72–e112.

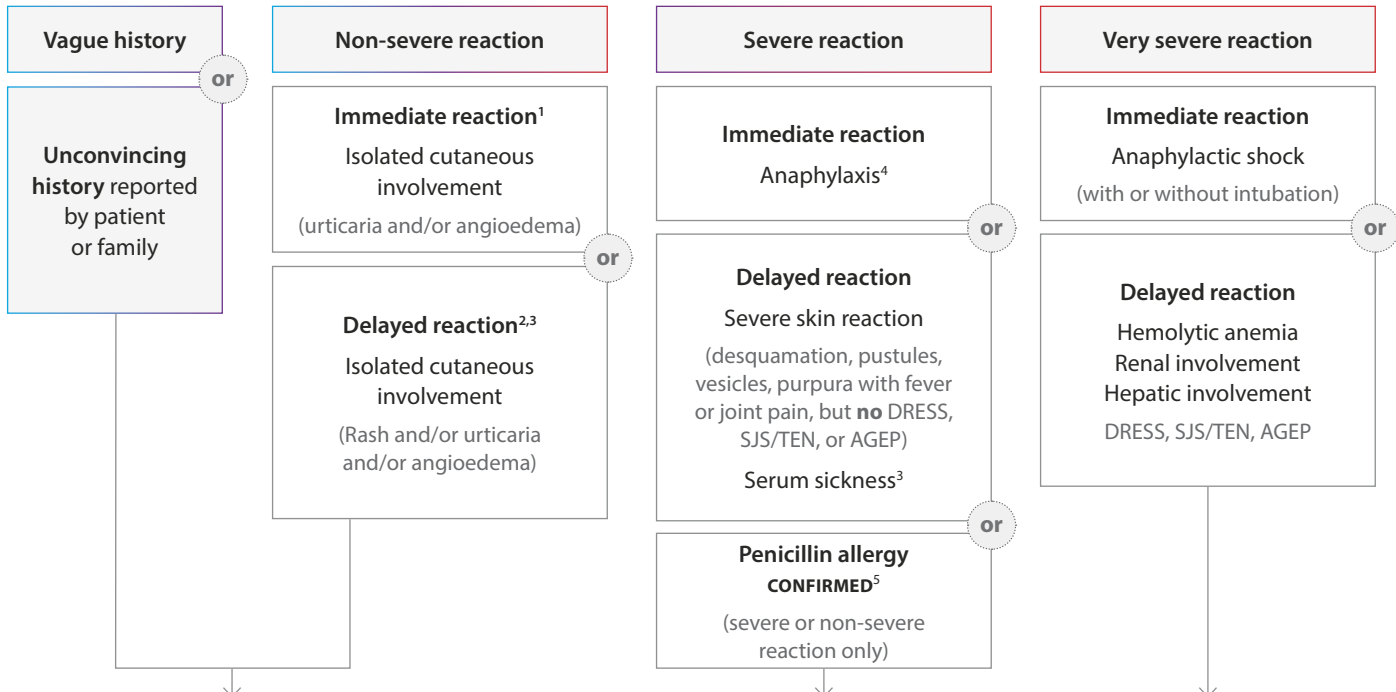
Wald ER, Applegate KE, Bordley C, Darrow DH, Glode MP, Marcy SM, et al. "Clinical practice guideline for the diagnosis and management of acute bacterial sinusitis in children aged 1 to 18 years." *Pediatrics* 2013;132(1):e262–80.

Please note that other references have been consulted.

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ASSESS THE SEVERITY OF THE INITIAL REACTION

SEVERITY OF PREVIOUS ALLERGIC REACTION TO PENICILLIN ANTIBIOTICS



DECISION-MAKING FOR CHOOSING A BETA-LACTAM AND THE CONDITIONS OF ADMINISTRATION

THE FOLLOWING CAN BE PRESCRIBED SAFELY

DISSIMILAR cephalosporins

Cefuroxime axetil⁶

SIMILAR cephalosporins

Cefprozil if history of allergy does not suggest an immediate reaction...

If in doubt about the possibility of an immediate reaction...

a 1-hour observation period after the administration of the 1st dose of Cefprozil under the supervision of a health professional could be advised according to the clinician judgment.

PRESCRIBE THE FOLLOWING WITH CAUTION

Penicillins

Amoxicillin +/- Clavulanate

The 1st dose should **always** be administered under medical supervision.

If history of:

- **Immediate reactions**, a drug provocation test should be performed;
- **Delayed reactions**, the patient or his/her family should be informed of the possible risk of recurrence in the days following initiation of the antibiotic.

PRESCRIBE THE FOLLOWING WITH CAUTION

DISSIMILAR cephalosporins

Cefuroxime axetil⁶

SIMILAR cephalosporins

Cefprozil **ONLY** if serum sickness-like reactions occurred in childhood³.

The 1st dose should **always** be administered under medical supervision.

If history of:

- **Immediate reactions**, a drug provocation test should be performed;
- **Delayed reactions**, the patient or his/her family should be informed of the possible risk of recurrence in the days following initiation of the antibiotic.

AVOID PRESCRIBING

Penicillins

Amoxicillin +/- Clavulanate

SIMILAR cephalosporins

Cefprozil for all other clinical situations (with the exception of children with a history of serum sickness-like reactions³, as described above).

IF A BETA-LACTAM⁷ CANNOT BE ADMINISTERED, THE FOLLOWING CAN BE PRESCRIBED...

Clarithromycin

AVOID PRESCRIBING

Beta-lactams⁷

Choose another class of antibiotics.

PRESCRIBE THE FOLLOWING

Clarithromycin

1. Immediate reaction (type I or IgE-mediated): usually occurs within one hour after taking the **first dose** of an antibiotic.
2. Delayed reaction (types II, III and IV): may occur at any time from one hour after administration of a drug.
3. Delayed skin reactions and serum sickness-like reactions that occur in children on antibiotic therapy are generally non-allergic and may be of viral origin.
4. Anaphylaxis without shock or intubation: requires an extra level of vigilance.
5. With no recommendations concerning other beta-lactams.
6. Cefuroxime axetil as an oral suspension is not widely used due to its unpleasant taste. See the product monograph to learn how to improve the taste of this medication.
7. Penicillins, cephalosporins and carbapenems.

For further information, see [the interactive tool](#) and [the decision-making tool](#).

AGEP : acute generalized exanthematous pustulosis;
DRESS : drug reaction with eosinophilia and systemic symptoms;
SJS : Stevens–Johnson syndrome;
TEN : toxic epidermal necrolysis.

**FIRST-LINE ANTIBIOTIC THERAPY FOR ACUTE BACTERIAL RHINOSINUSITIS
IF HISTORY OF ALLERGIC REACTION TO A PENICILLIN ANTIBIOTIC**

	Antibiotic	Daily dosage	Maximum dosage	Treatment duration
Beta-lactams ³ recommended, according to the clinical judgement support algorithm	Cefuroxime axetil ¹	30 mg/kg/day PO ÷ BID	500 mg PO BID	10 to 14 days
	Cefprozil			
	Amoxicillin	90 mg/kg/day PO ÷ BID	2 000 mg PO BID	
	Amoxicillin/Clavulanate ² (7:1 formulation) OR Amoxicillin + Amoxicillin-Clavulanate ² (7:1 formulation)	90 mg/kg/day PO ÷ BID OR 45 mg/kg/day PO ÷ BID + 45 mg/kg/day PO ÷ BID	1 500 mg PO BID OR 750 mg PO BID + 750 mg PO BID	
Alternative if a beta-lactam ³ cannot be administered ⁴	Clarithromycin	15 mg/kg/day PO ÷ BID	500 mg PO BID	

1. Cefuroxime axetil as an oral suspension is not widely used due to its unpleasant taste. See the product monograph to learn how to improve the taste of this medication.
 2. The 7:1 formulation (BID) of amoxicillin-clavulanate is preferred due to its higher digestive tolerance. The 200 mg/5 ml and 400 mg/5 ml formulations and 875 mg tablets contain the correct ratio of amoxicillin and clavulanic acid. Some clinicians use a combination of amoxicillin (45 mg/kg/day) and amoxicillin-clavulanate (7:1 formulation) (45 mg/kg/day) to reduce adverse effects (total of 90 mg/kg/day, 14:1 equivalent); volumes of amoxicillin and amoxicillin-clavulanate to be given could be different.
 3. Penicillins, cephalosporins and carbapenems.
 4. Azithromycin has no indication for acute bacterial rhinosinusitis.
- !** If the cautious administration of penicillin is the option chosen, opt for amoxicillin/clavulanate instead of amoxicillin alone if the following applies : antibiotics used in the past 30 days.