MINISTRY OF HEALTH
SINGAPORE

Management of Rhinosinusitis and Allergic Rhinitis

MOH Clinical Practice Guidelines 2/2010

Academy of Medicine, Singapore

Chapter of Otorhinolaryngologists College of Surgeons, Singapore

College of Family Physicians, Singapore

SOHNSS
SOCIETY OF OTOLARYNGOLOGY
HEAD & NECK SURGERY
SINGAPORE

Feb 2010

Levels of evidence and grades of recommendation

Levels of evidence

Level	Type of Evidence
1^{++}	High quality meta-analyses, systematic reviews of randomised controlled trials (RCTs), or RCTs with a very low risk of bias.
1^{+}	Well conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias.
1^{-}	Meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias
2^{++}	High quality systematic reviews of case control or cohort studies. High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal
2^{+}	Well conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal
2^{-}	Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal
3	Non-analytic studies, e.g. case reports, case series
4	Expert opinion

Grades of recommendation

Grade	Recommendation
A	At least one meta-analysis, systematic review of RCTs, or RCT rated as 1^{++} and directly applicable to the target population; or A body of evidence consisting principally of studies rated as 1^{+}, directly applicable to the target population, and demonstrating overall consistency of results
B	A body of evidence including studies rated as 2^{++}, directly applicable to the target population, and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 1^{++} or 1^{+}
C	A body of evidence including studies rated as 2^{+}, directly applicable to the target population and demonstrating overall consistency of results; or Extrapolated evidence from studies rated as 2^{++}
D	Evidence level 3 or 4; or Extrapolated evidence from studies rated as 2^{+}
GPP (good practice points)	Recommended best practice based on the clinical experience of the guideline development group.

CLINICAL PRACTICE GUIDELINES

Management of Rhinosinusitis and Allergic Rhinitis

MOH Clinical Practice Guidelines 2/2010

Published by Ministry of Health, Singapore
16 College Road,
College of Medicine Building
Singapore 169854

Printed by Golden City Colour Printing Co. (Pte) Ltd

ISBN 978-981-08-5211-5

Available on the MOH website: http://www.moh.gov.sg/cpg

Statement of Intent

These guidelines are not intended to serve as a standard of medical care. Standards of medical care are determined on the basis of all clinical data available for an individual case and are subject to change as scientific knowledge advances and patterns of care evolve.

The contents of this publication are guidelines to clinical practice, based on the best available evidence at the time of development. Adherence to these guidelines may not ensure a successful outcome in every case. These guidelines should neither be construed as including all proper methods of care, nor exclude other acceptable methods of care. Each physician is ultimately responsible for the management of his/her unique patient, in the light of the clinical data presented by the patient and the diagnostic and treatment options available.

Contents

Foreword

Rhinosinusitis is one of the most common health problems encountered by primary care physicians worldwide. The condition is made up of infectious rhinitis (including upper respiratory tract infections) and allergic rhinitis.

In Singapore, the 2005 Primary Care Survey[1] found that the leading condition seen at primary care clinics was upper respiratory tract infections, accounting for 29% of consultations; an earlier study[2] put the prevalence of rhinitis in schoolchildren at 44%. While usually self-limited, the commonness of the common cold (acute viral rhinosinusitis) means that it is a condition with significant impact on ability to function and quality of life. The common cold should also be distinguished from acute bacterial rhinosinusitis. Variation in investigation and treatment is a concern, as is inappropriate use of antibiotics.

The prevalence of allergic rhinitis in the general adult population in Singapore has been estimated at 5.5%.[3] Allergic rhinitis is more common in children and prevalence may be as high as 40% in school-going children.[4] Allergic rhinitis in children may be associated with co-morbidities including asthma, atopic dermatitis/eczema, allergic conjunctivitis, chronic sinusitis and chronic otitis media with effusion.

It is therefore timely to develop this first national guideline which incorporates the best available evidence from the scientific literature and expert consensus, to assist primary care physicians in the management of rhinosinusitis. I hope you will find the guidance useful in managing your patients.

PROFESSOR K SATKU
DIRECTOR OF MEDICAL SERVICES

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[1] Primary Care Survey 2005, Integrated Health Services Division, Ministry of Health, Singapore.

[2] Goh DYT, Chew FT, Quek SC, Lee BW. Prevalence and severity of asthma, rhinitis, and eczema in Singapore schoolchildren. Arch Dis Child 1996;74:131–135.

[3] Ng TP, Tan WC. Epidemiology of chronic (perennial) rhinitis in Singapore: prevalence estimates, demographic variation and clinical allergic presentation. Ann Acad Med Singapore. 1994 Jan;23(1):83-8.

[4] Wright AL, Holberg CJ, Martinez FD, Halonen M, Morgan W, Taussig LM. Epidemiology of physician-diagnosed allergic rhinitis in childhood. Pediatrics 1994; 94:895- 901.

Executive summary of key recommendations

Details of recommendations can be found in the main text at the pages indicated.

Management of common cold (acute viral rhinosinusitis) and use of antibiotics in acute bacterial rhinosinusitis

Acute viral rhinosinusitis (common cold)

A Antibiotics are not recommended for treatment of the common cold in children or adults (pg 17).

Grade A, Level 1++

A Dextromethorphan should be considered as a treatment option for adults with cough caused by the common cold (pg 17).

Grade A, Level 1++

A Topical (intranasal) or oral nasal decongestants, used for up to three days, is recommended for adolescents and adults with the common cold (pg 17).

Grade A, Level 1+

A Topical ipratropium may be considered as a treatment option for nasal congestion in children older than six years and in adults with moderate to severe common cold (pg 18).

Grade A, Level 1+

A Codeine and other narcotics, dextromethorphan, anti-histamines, and combination anti-histamine/decongestants are not recommended to treat cough or other cold symptoms in children (pg 18).

Grade A, Level 1++

A First-generation anti-histamines and combination anti-histamine/ decongestants may be considered for cough and cold symptoms in adults if the benefits outweigh the adverse effects (pg 18).

Grade A, Level 1++

A Vitamin C, zinc, and Echinacea are not recommended for active treatment of common cold due to lack of effectiveness in preventing the common cold(pg 18).

Grade A, Level 1++

Use of antibiotics in acute bacterial rhinosinusitis

Adults

A Antibiotics are not recommended for adults with non-severe acute bacterial rhinosinusitis (mild pain and temperature < 38.3 degrees centigrade) till after 10 days of symptoms from onset (pg 18).

Grade A, Level 1+

D Besides severity of illness, the patient's age, general health, cardiopulmonary status, and co-morbid conditions should be considered in deciding start of antibiotic treatment in patients with acute bacterial rhinosinusitis (pg 19).

Grade D, Level 4

A The first-line empiric antibiotic for adults with acute bacterial rhinosinusitis is amoxicillin. If the patient is allergic to amoxicillin, trimethoprim-sulfamethoxazole or macrolides may be used (pg 19).

Grade A, Level 1+

A For adults with acute bacterial rhinosinusitis, the recommended duration of appropriate oral antibiotic regime is 7 days. Clinician assessment after 7 days is recommended. Antibiotic regime can be extended to 14 days if patient's symptoms fail to resolve (pg 19).

Grade A, Level 1++

B A second-line antibiotic such as high dose amoxicillin-clavulanate, ampicillin-sulbactam or flouroquinolone should be considered in adults with acute bacterial rhinosinusitis if there is no clinical response after at least 7 days of first line antibiotics (pg 19).

Grade B, Level 2+

Children

D Appropriate antibiotic regimes are recommended for children with the following conditions:

1. Non-severe acute bacterial rhinosinusitis: In a child with protracted symptoms with asthma, chronic bronchitis or acute otitis media.
2. Severe acute bacterial rhinosinusitis: In ambulatory patients, an oral antibiotic resistant to beta-lactamase enzymes (amoxicillin-clavunate or a second generation cephalosporin such as cefuroxime axetil).

3. Severe illness or toxic condition: In a child with suspected or proven suppurative complication.
(pg 20) **Grade D, Level 4**

D Intravenous antibiotic effective against penicillin-resistant Streptococcus pneumonia, beta-lactamase producing Haemophilus influenzae and Moraxella catarrhalis should be used in children with severe acute bacterial rhinosinusitis (pg 20).

Grade D, Level 4

D Amoxicillin (45 mg/kg/day, doubled if age under 2 years or with risk factors for resistance) is recommended for a child with non-severe acute bacterial rhinosinusitis with protracted symptoms. If the symptoms do not improve within 72 hours, an antibiotic against the resistant organism prevalent in the community should be considered. Azithromycin or clarithromycin as first-line therapy is recommended in penicillin allergy (pg 20).

Grade D, Level 4

Management of infective rhinosinusitis in adults

Acute rhinosinusitis

GPP Other diagnosis should be considered in adults with acute rhinosinusitis who present with unilateral symptoms of bleeding, crusting, or cacosmia (pg 22).

GPP

D Immediate referral to an ENT specialist is indicated for acute rhinosinusitis in adults who present with sinister signs indicative of complications of acute intermittent rhinosinusitis. These include:

- Peri-orbital oedema
- Displaced globe
- Double vision
- Ophthalmoplegia
- Reduced visual acuity
- Severe unilateral or bilateral frontal headache
- Frontal swelling
- Signs of meningitis or focal neurological deficits

(pg 23) **Grade D, Level 4**

D Plain sinus x-rays are not recommended for the diagnosis of acute rhinosinusitis in adults (pg 23).

Grade D, Level 4

Treatment of acute rhinosinusitis

D Alleviate symptoms of mild acute rhinosinusitis in adults with the following options

- Decongestants
- Nasal saline spray and/ or irrigation
- Antihistamines, only in patients with concomitant allergic rhinitis
- Analgesics

(pg 23) **Grade D, Level 4**

D Treat underlying inflammatory process of moderate to severe acute rhinosinusitis in adults with:

- Intranasal steroid
- Antibiotic, empiric: 7-14 days

Alleviate symptoms with the following options:

- Decongestants
- Nasal saline spray and/ or irrigation
- Antihistamines, in patients with concomitant allergic rhinitis
- Analgesics

(pg 24) **Grade D, Level 4**

GPP The workgroup recommends that patients with acute rhinosinusitis should be reviewed for **symptom resolution**. Patients whose symptoms worsen or persist despite therapy should be referred to a specialist for further evaluation and management (pg 24).

GPP

A Nasal steroid spray twice daily is recommended for adults with acute rhinosinusitis which has not resolved after 5 days of initial presentation (pg 26).

Grade A, Level 1+

A Oral corticosteroids are not recommended for adults with acute rhinosinusitis (pg 27).

Grade A, Level 1+

D Antihistamines are not recommended in the treatment of acute bacterial rhinosinusitis in adults (pg 27).

Grade D, Level 4

A Antihistamines may be used as an adjunct to antibiotic treatment in acute bacterial rhinosinusitis patients with concomitant allergic rhinitis (pg 27).

Grade A, Level 1+

D New generation oral antihistamines are preferred in adults with acute rhinosinusitis for their favourable efficacy/safety ratio and pharmacokinetics. Refrain from first generation antihistamines to avoid sedation and anti-cholinergic side effects (pg 27).

Grade D, Level 4

GPP Topical decongestants may be used for adults with acute rhinosinusitis whose symptoms fail to resolve after 10 days of initial presentation (pg 27).

GPP

GPP The duration of treatment with topical decongestants should be limited to less than 10 days to avoid rhinitis medicamentosa (pg 28).

GPP

A Nasal hypertonic saline irrigation, alone or in conjunction with other adjunctive measures, may be used to reduce symptoms and medication use in adults with frequent acute rhinosinusitis (pg 28).

Grade A, Level 1+

D Mucolytics are not recommended to be prescribed routinely for adult patients with acute rhinosinusitis (pg 29).

Grade D, Level 4

Chronic rhinosinusitis

GPP All adults with persistent and recurrent rhinosinusitis should be referred to a specialist for nasal endoscopy to assess for differential causes (pg 30).

GPP

GPP Other diagnosis should be considered in adults with chronic rhinosinusitis who present with unilateral symptoms of bleeding, crusting, or cacosmia (pg 30).

GPP

D Immediate referral to an ENT specialist is indicated for chronic rhinosinusitis in adults who present with sinister signs such as:

- Peri-orbital oedema
- Displaced globe
- Double vision
- Ophthalmoplegia
- Reduced visual acuity
- Severe unilateral or bilateral frontal headache
- Frontal swelling
- Signs of meningitis or focal neurological deficits.

(pg 31) **Grade D, Level 4**

D Sinus x-rays are **not** recommended to support the diagnosis of chronic rhinitis in adults (pg 31).

Grade D, Level 4

Treatment of chronic rhinosinusitis without nasal polyps

D For chronic rhinosinusitis without nasal polyps, alleviate symptoms with the following options:

- Nasal saline irrigation

Treat underlying inflammatory process with:

- Intranasal steroid
- Antibiotic, in patients with acute exacerbation of chronic rhinosinusitis, culture directed: 10-14 days

(pg 33) **Grade D, Level 4**

C Short-term oral antibiotics are recommended for acute exacerbation of chronic rhinosinusitis without nasal polyps (pg 33).

Grade C, Level 2+

A Nasal corticosteroids may be prescribed for chronic rhinosinusitis without nasal polyps (pg 33).

Grade A, Level 1+

A Nasal saline irrigation may be prescribed for chronic rhinosinusitis without nasal polyps (pg 34).

Grade A, Level 1+

GPP Oral steroids, oral/topical decongestants, mucolytics or antihistamines are not recommended in treatment of chronic rhinosinusitis without nasal polyps (pg 34).

GPP

Treatment of chronic rhinosinusitis with nasal polyps

D For chronic rhinosinusitis with nasal polyps, alleviate symptoms with the following options:

- Nasal saline irrigation
- Anti-histamines, in patients with concomitant allergic rhinitis

Treat underlying inflammatory process with:

- Intranasal steroid.

(pg 35) **Grade D, Level 4**

GPP Adults with chronic rhinosinusitis with nasal polyps should be reviewed for symptom control. Patients whose symptoms worsen during or persist despite therapy should be referred to a specialist for further evaluation and management (pg 35).

GPP

C Short-term oral antibiotics are recommended to improve symptoms in acute exacerbation of chronic rhinosinusitis with nasal polyps (pg 36).

Grade C, Level 2+

C Long-term, low-dose macrolide therapy may be considered for chronic rhinosinusitis patients with nasal polyps (pg 36).

Grade C, Level 2+

GPP Management by a specialist is recommended for patients with chronic rhinosinusitis with nasal polyps being prescribed long term, low dose macrolide therapy, in view of its side effects (pg 36).

GPP

A Nasal corticosteroid therapy may be used in adults with chronic rhinosinusitis with nasal polyps (pg 36).

Grade A, Level 1+

C Antihistamines are not recommended in chronic rhinosinusitis with nasal polyps (pg 37).

Grade C, Level 2+

Management of infective rhinosinusitis in children

GPP Allergic rhinitis often coexists with paediatric acute and chronic rhinosinusitis. The history should evaluate for symptoms of allergic rhinitis and identify possible allergens (pg 39).

GPP

GPP Otoscopy should be performed routinely to exclude otitis media in paediatric acute and chronic rhinosinusitis (pg 40).

GPP

D Plain X-ray is not recommended routinely to confirm the diagnosis of rhinosinusitis in children (pg 40).

Grade D, Level 4

A Topical corticosteroids may be used in children as an adjunct to antibiotics. It can reduce the cough and nasal discharge earlier in acute bacterial rhinosinusitis (pg 43).

Grade A, Level 1+

GPP Topical decongestants should be used in children no longer than 4-5 days to avoid toxicity and rhinitis medicamentosa (pg 43).

GPP

D Saline nose drops or sprays may be considered to decrease the mucus trapping and crusting associated with acute rhinosinusitis in children (pg 43).

Grade D, Level 3

D The workgroup recommends antibiotics use only in acute exacerbation of paediatric chronic rhiosinusitis, by following the recommendations from the Consensus Meeting in Brussels, 1996:

- For chronic rhinosinusitis, especially with frequent exacerbations, 2 weeks of oral antibiotics is advised. The antibiotic is changed if there is no response within 5-7 days.
- Failing this, sinus secretions for culture or investigations to exclude recalcitrant causes are considered.
- If there is slow response, a second 2-week course can be prescribed.

- In rare cases with clear-cut improvement but persisting symptoms, a 3rd course can be given before surgery is considered.
- Parenteral antibiotic may be appropriate if oral antibiotics fail.

(pg 44) **Grade D, Level 4**

C Nasal douching may be considered for paediatric chronic rhinosinusitis (pg 44).

Grade C, Level 2+

D Antral lavage, inferior meatal antrostomy (except possibly in primary ciliary dyskinesia), Caldwell-Luc operation (risks damage to un-erupted teeth) are not recommended in paediatric chronic rhinosinusitis (pg 45).

Grade D, Level 3

Management of allergic rhinitis

GPP The diagnosis of allergic rhinitis should be made based upon concordance between a typical history of allergic symptoms and diagnostic tests (pg 48).

GPP

D The workgroup recommends using the algorithm for the diagnosis and assessment of severity of allergic rhinitis proposed by ARIA 2008 (refer to Figure 6 on page 48) (pg 48).

Grade D, Level 4

GPP Besides a nasal examination for allergic rhinitis, look out for:

- Ocular signs of irritation e.g. allergic conjunctivitis; redness and rubbing of eyes indicative of itchiness.
- Chest examination to rule out concurrent asthma.

(pg 49) **GPP**

D The workgroup recommends using the algorithm for the classification of allergic rhinitis proposed by ARIA 2008 (refer to Figure 7 on page 49) (pg 49).

Grade D, Level 4

D The workgroup recommends using the algorithm for the management of allergic rhinitis proposed by ARIA 2008 (refer to Figure 8 on page 51) (pg 50).

Grade D, Level 4

GPP Mattress encasings or High Efficiency Particulate Air Filters for house dust mite and pet allergy in adults with rhinitis should be part of the overall management of allergic rhinitis (pg 52).

GPP

A Second-generation oral or intranasal H1-antihistamines are recommended for the treatment of allergic rhinitis and conjunctivitis in adults and children (pg 52).

Grade A, Level 1++

A Intranasal glucocorticosteroids are strongly recommended for the treatment of allergic rhinitis in adults and children (pg 52).

Grade A, Level 1++

D Intramuscular glucocorticosteroids and the long term use of oral preparations are not recommended for the treatment of allergic rhinitis due to safety concerns (pg 52).

Grade D, Level 3

A Topical H1-antihistamines are recommended for the treatment of allergic rhinitis and conjunctivitis. Its therapeutic effects are superior and faster than oral anti-histamines (pg 52).

Grade A, Level 1+

A Intranasal ipratropium may be considered as a treatment option for rhinorrhoea associated with allergic rhinitis (pg 52).

Grade A, Level 1+

A Topical chromones should be considered as a treatment option for allergic rhinitis and conjunctivitis. However, they are only moderately effective (pg 53).

Grade A, Level 1+

A Montelukast may be considered as a treatment option for seasonal allergic rhinitis and asthma in patients over 6 years of age. It should not be used more than 4 weeks since there is limited data of its efficacy in patients with persistent allergic rhinitis for more than 4 weeks (pg 53).

Grade A, Level 1+

C Intranasal decongestants may be used for a short period of time in patients with severe nasal obstruction caused by allergic rhinitis (pg 53).

Grade C, Level 2+

C Oral decongestants (and their combination with oral H1-antihistamines) may be considered in the treatment of allergic rhinitis in adults, but side effects are common (pg 53).

Grade C, Level 2++

GPP Education of patient and/or patient's carer on the management of allergic rhinitis should be considered as an option to maximize compliance and optimize treatment outcomes (pg 54).

GPP

Paediatric aspects of allergic rhinitis

GPP Symptoms of sneezing, nasal itching, discharge and congestion that persist longer than 2 weeks should prompt a search for a cause other than infection in children (pg 55).

GPP

GPP It is recommended to ask about family history of atopy and progression of atopy of the child (pg 55).

GPP

B Skin prick tests should be performed and interpreted reliably early in life (pg 55).

Grade B, Level 2+

GPP The principles of treatment are the same in children as in adults with allergic rhinitis, but dosages should be adapted and care should be taken to avoid the side effects involving impairment of growth and cognitive development (pg 56).

GPP

GPP Pharmacologic management for allergic rhinitis in children should be individualized and polypharmacy avoided (pg 56).

GPP

A Intranasal glucocorticosteroid with bioavailability of <1% such as fluticasone propionate or mometasone furoate should be considered as a treatment option for allergic rhinitis and allergic conjunctivitis (pg 56).

Grade A, Level 1++

B Intranasal glucocorticosteroids with high bioavailability such as betamethasone should not be used in children with allergic rhinitis due to its effect upon growth and growth velocity (pg 56).

Grade B, Level 1++

A Oral and depot glucocorticosteroid preparations should be avoided in children with allergic rhinitis due to negative effect on short term growth and growth velocity (pg 56).

Grade A, Level 1+

A Second generation H1-antihistamines such as cetirizine, levocetrizine and loratadine should be considered as a treatment option in the treatment of allergic rhinitis in children (pg 57).

Grade A, Level 1+

GPP Nasal saline drops or spray may be considered in children with allergic rhinitis to clear the nose before eating or sleeping (pg 57).

GPP

A Sublingual immunotherapy (SLIT) should be considered in children above age 5 years who have poor symptomatic control of allergic rhinitis despite maximal therapy or who cannot or will not take medication (pg 57).

Grade A, Level 1++

GPP The family and the child should be educated about the recurrent or persistent nature of the disease, allergen avoidance and avoidance of allergen triggers and respiratory tract irritants, the most important of which is tobacco smoke (pg 58).

GPP

Management of rhinitis in pregnancy

D Nasal endoscopy on a decongested nose may be considered as an option to differentiate pregnancy rhinitis from sinusitis (pg 61).

Grade D, Level 4

D Imaging studies are not recommended to make a diagnosis in rhinitis in pregnancy (pg 61).

Grade D, Level 4

D Skin prick tests are not recommended for rhinitis in pregnancy because use of potent antigens in skin testing may be associated with systemic reactions (pg 61).

Grade D, Level 4

GPP In treating rhinitis of pregnancy, all drug therapy should ideally be avoided especially in the first trimester. If drug therapy cannot be avoided then treatment will depend upon the predominant symptoms, with the topical agents as first line since they have minimal systemic exposure (pg 62).

GPP

C Cromones are safe with no known teratogenic effect but they are moderately effective. It may be given for the treatment of rhinitis in the first 3 months of pregnancy, 3-4 times daily (pg 62).

Grade C, Level 2+

C If cromones are ineffective and poorly tolerated, they should be replaced with anti-histamines. Chlorpheniramine and tripelennamine are the anti-histamines of choice for pregnant women with rhinitis. Cetirizine and loratadine may be considered after the first trimester (pg 62).

Grade C, Level 2+

C Intranasal steroids should be prescribed as an alternative to or in combination with anti-histamines for severe cases of rhinitis in pregnancy (pg 62).

Grade C, Level 2+

C Budesonide is the only recommended intranasal steroid for rhinitis in pregnancy (pg 62)

Grade C, Level 2+

C Topical decongestants like oxymetazoline may be considered as second-line therapy for short-term relief and when no other safer alternatives are available for the treatment of rhinitis in pregnancy (pg 63).

Grade C, Level 2+

C Oral decongestants are not recommended for rhinitis in pregnancy (pg 63).

Grade C, Level 2+

C Leukotriene Modifiers are not recommended for allergic rhinitis in pregnancy (pg 63).

Grade C, Level 2+

A Amoxicillin is the drug of choice for pregnant patients with rhinitis who are not allergic to penicillin (pg 63).

Grade A, Level 1+

D Amoxicillin-clavulanate or cephalosporin may be given to pregnant women with rhinitis not responding to amoxicillin (pg 63).

Grade D, Level 3

C Metronidazole should be used in rhinitis in pregnancy caused by anaerobic pathogens (pg 63).

Grade C, Level 2+

D Immunotherapy is not recommended for rhinitis in pregnancy. However, it may be continued if the maintenance phase has been reached (pg 63).

Grade D, Level 4

1 Introduction

1.1 Background information

The two most common diagnoses of rhinitis encountered in clinical practice in Singapore are infectious rhinitis, including upper respiratory tract infections, and allergic rhinitis. These two conditions form the main focus of this clinical practice guideline.

Rhinitis is defined as an inflammation of the lining of the nose and is characterized by nasal symptoms including anterior or posterior rhinorrhea, sneezing, nasal blockage and/or itching of the nose. These symptoms occur during two or more consecutive days for more than one hour on most days.

Sinusitis and rhinitis usually coexist and are concurrent in most individuals; thus, the correct terminology for sinusitis is **rhinosinusitis**.

These clinical practice guidelines aim to help clinicians manage rhinosinusitis based on the best available evidence as well as expert opinion in areas where studies are lacking.

1.2 Development of guidelines

Clinical practice guidelines from the World Health Organization, USA and the European Union were evaluated and local data when available were included into this CPG. Recommendations are based on locally available prescriptions and procedures. This workgroup was made up of otorhinolaryngologists with a special interest in rhinology and paediatric otorhinolaryngology, pediatricians and a general practitioner.

1.3 Objectives

The main objective of these guidelines is to provide evidence based management strategies for the diagnosis and treatment of the two most common causes of rhinosinusitis i.e. infective rhinosinusitis and allergic rhinitis at the primary care level and guidelines for specialist referral.

1.4 Review of guidelines

Evidence based clinical guidelines are only as current as the evidence that supports them. Users must keep in mind that new evidence could supersede recommendations in these guidelines. The workgroup advises that these guidelines be scheduled for review five years after publication or if new evidence appears that requires substantive changes to the recommendations.

2 Management of common cold (acute viral rhinosinusitis) and use of antibiotics in acute bacterial rhinosinusitis

There is a very high incidence of acute viral rhinosinusitis (common cold). Adults, in general, suffer 2 to 5 colds per year and school children 6 to 8 colds per year. The most common agents are Rhinovirus (24%) and Influenza virus (11%).[1] Bacterial infections, which may be mild and often resolve spontaneously, complicate only 0.5% to 2% of acute viral rhinosinusitis.[2]

Differentiating between a bacterial (acute bacterial rhinosinusitis) and viral (viral rhinosinusitis) etiology is largely symptom and duration based.

2.1 Acute viral rhinosinusitis (common cold)

In acute viral rhinosinusitis, the duration of symptoms is usually less than 10 days.

A common cold is characterized by sore throat, malaise and low-grade fever at onset. These symptoms resolve within a few days and are followed by nasal congestion, rhinorrhea, and cough within 24 to 48 hours after onset of the first symptoms. The second set of symptoms are what prompt most patients to see a physician for relief.[3] Symptoms usually peak around day 3 or 4 and begin to resolve by day 7.[4] Nasal discharge, appearing at the peak of illness, can become thick and purulent and may be misdiagnosed as a bacterial sinus infection.[1]

A Antibiotics are not recommended for treatment of the common cold in children or adults.[5,6]

Grade A, Level 1++

A Dextromethorphan should be considered as a treatment option for adults with cough caused by the common cold.[7,8]

Grade A, Level 1++

A Topical (intranasal) or oral nasal decongestants, used for up to three days, is recommended for adolescents and adults with the common cold.[9,10]

Grade A, Level 1+

A Topical ipratropium may be considered as a treatment option for nasal congestion in children older than six years and in adults with moderate to severe common cold.[11]

Grade A, Level 1+

A Codeine and other narcotics, dextromethorphan, anti-histamines, and combination anti-histamine/decongestants are not recommended to treat cough or other cold symptoms in children.[7,12-14]

Grade A, Level 1++

A First-generation anti-histamines and combination anti-histamine/decongestants may be considered for cough and cold symptoms in adults if the benefits outweigh the adverse effects.[15]

Grade A, Level 1++

A Vitamin C, zinc, and Echinacea are not recommended for active treatment of common cold due to lack of effectiveness in preventing the common cold.[15,16,16a]

Grade A, Level 1++

However, among available complementary treatments, vitamin C prophylaxis may decrease the severity and duration of cold symptoms.[15,16]

2.2 Use of antibiotics in acute bacterial rhinosinusitis

When symptoms persist for more than 10 days, or double worsening occurs in which symptoms initially improve, but then worsen within a 10-day period, bacterial sinusitis is presumed.[17]

ADULTS

A Antibiotics are not recommended for adults with non-severe acute bacterial rhinosinusitis (mild pain and temperature < 38.3 degrees centigrade) till after 10 days of symptoms from onset.[18,19]

Grade A, Level 1+

The rationale for observing acute bacterial rhinosinusitis is based upon a high percentage of spontaneous improvement when patients receive placebo in randomized controlled trials and the modest incremental benefit from antibiotic therapy.[18,19]

Using this time course of symptoms as a guide reduces the inappropriate use of antibiotics for viral illness and reduces the development of antibiotic resistant organisms and side effects associated with antibiotic use.[20]

D Besides severity of illness, the patient's age, general health, cardiopulmonary status, and co-morbid conditions should be considered in deciding start of antibiotic treatment in patients with acute bacterial rhinosinusitis.[17]

Grade D, Level 4

A The first-line empiric antibiotic for adults with acute bacterial rhinosinusitis is amoxicillin.[19,21-25] If the patient is allergic to amoxicillin, trimethoprim-sulfamethoxazole[18,23,24,26,27] or macrolides may be used.

Grade A, Level 1+

A For adults with acute bacterial rhinosinusitis, the recommended duration of appropriate oral antibiotic regime is 7 days. Clinician assessment after 7 days is recommended. Antibiotic regime can be extended to 14 days if patient's symptoms fail to resolve.[28]

Grade A, Level 1++

B A second-line antibiotic such as high dose amoxicillin-clavulanate, ampicillin-sulbactam or flouroquinolone should be considered in adults with acute bacterial rhinosinusitis if there is no clinical response after at least 7 days of first line antibiotics.[29,30]

Grade B, Level 2+

Short-course oral antibiotic regime has comparable effectiveness to a longer course of therapy in acute bacterial rhinosinusitis. Shorter duration of treatment, particularly for patients without severe disease and complicating factors, might lead to fewer adverse events, better patient compliance, lower rates of resistance development and fewer costs.[28]

CHILDREN

D Appropriate antibiotic regimes are recommended for children with the following conditions:[31]

1. Non-severe acute bacterial rhinosinusitis: In a child with protracted symptoms with asthma, chronic bronchitis or acute otitis media.
2. Severe acute bacterial rhinosinusitis: In ambulatory patients, an oral antibiotic resistant to beta-lactamase enzymes (amoxicillin-clavunate or a second generation cephalosporin such as cefuroxime axetil).
3. Severe illness or toxic condition: In a child with suspected or proven suppurative complication.

Grade D, Level 4

D Intravenous antibiotics effective against penicillin-resistant Streptococcus pneumonia, beta-lactamase producing Haemophilus influenzae and Moraxella catarrhalis should be used in children with severe acute bacterial rhinosinusitis.

Grade D, Level 4

D Amoxicillin (45 mg/kg/day, doubled if age under 2 years or with risk factors for resistance) is recommended for a child with non-severe acute bacterial rhinosinusitis with protracted symptoms. If the symptoms do not improve within 72 hours, an antibiotic against the resistant organism prevalent in the community should be considered. Azithromycin or clarithromycin as first-line therapy is recommended in penicillin allergy.[32]

Grade D, Level 4

3 Management of infective rhinosinusitis in adults

3.1 Acute rhinosinusitis

3.1.1 Diagnosis

The diagnosis of acute rhinosinusitis is based on symptoms. Nasal examination may yield supporting signs. Radiographic imaging is unnecessary in patients who meet the diagnostic criteria, unless there is suspicion of complications or an alternative diagnosis.

Symptoms and duration
A sudden onset of two or more of the symptoms:[33]

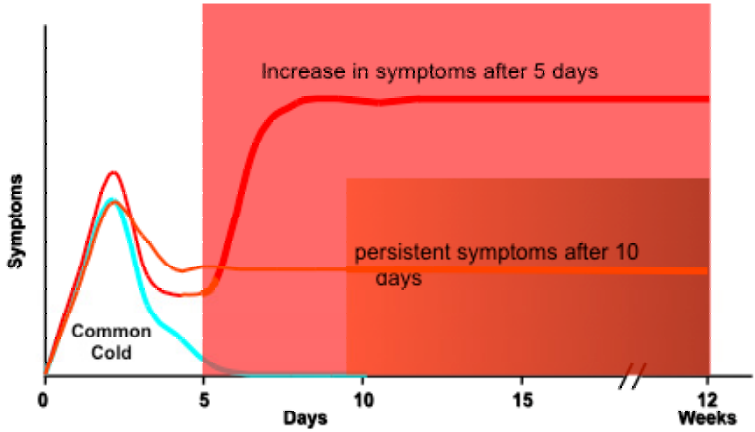
- blockage, congestion, or stuffiness;
- nasal discharge or post nasal drip, often mucopurulent;
- facial pain or pressure, headache, and
- reduction/loss of smell

Acute/ intermittent rhinosinusitis
The duration of two or more of above symptoms which last less than **12 weeks with** symptom-free intervals.[33]

Common cold/acute viral rhinosinusitis
The duration of two or more of above symptoms which last **less than 10 days** (without worsening or persistence of symptoms).[33] (Figure 1, pg 22)

Acute non-viral rhinosinusitis
Increase in symptoms after 5 days or persistent symptoms after 10 days with less than 12 weeks duration.[33] (Figure 1, pg 22)

Figure 1 Increase in symptoms after 5 days or persistent symptoms after 10 days with less than 12 weeks duration



Adapted from Fokkens at el. EP□OS Guidelines. *Rhinol Suppl.* **2005;18:1.**

Signs[33]

- Nasal: swelling, redness, deformity
- Oropharyngeal: postnasal drip
- Oral: dental infection
- Otologic: otitis media

Anterior rhinoscopy remains the basic tool in primary care to determine the existence of pathology, but alone is limited to examining the anterior portion of the sinonasal passages.

Nasal endoscopy helps identify oedema, inflammation, mucopurulent discharge, scarring, crusting, and nasal polyps.

GPP Other diagnosis should be considered in adults with acute rhinosinusitis who present with unilateral symptoms of bleeding, crusting, or cacosmia.

GPP

D Immediate referral to an ENT specialist is indicated for acute rhinosinusitis in adults who present with sinister signs indicative of complications of acute intermittent rhinosinusitis. These include[33]:

- Peri-orbital oedema
- Displaced globe
- Double vision
- Ophthalmoplegia
- Reduced visual acuity
- Severe unilateral or bilateral frontal headache
- Frontal swelling
- Signs of meningitis or focal neurological deficits

Grade D, Level 4

Imaging

D Plain sinus x-rays are not recommended for the diagnosis of acute rhinosinusitis in adults.[33-35]

Grade D, Level 4

Plain sinus x-rays have 76% sensitivity and 79% specificity in diagnosing acute non-viral rhinosinusitis, giving rise to significant false positive and negative results.[23]

3.1.2 Principle of treatment

The treatment guidelines are evidence-based and dictated by the severity of rhinosinusitis. The goals of medical treatment are:

- Alleviate symptoms
- Treat underlying inflammatory process and return sinuses back to health; and
- Prevent the development of acute complications

Mild acute rhinosinusitis[33]

D Alleviate symptoms of mild acute rhinosinusitis in adults with the following options (Figure 2, pg 25)

- Decongestants
- Nasal saline spray and/ or irrigation
- Antihistamines, only in patients with concomitant allergic rhinitis
- Analgesics

Grade D, Level 4

Moderate and severe acute rhinosinusitis[33]

D Treat underlying inflammatory process of moderate to severe acute rhinosinusitis in adults with: (Figure 2, pg 25)

- Intranasal steroid
- Antibiotic, empiric: 7-14 days

Alleviate symptoms with the following options:

- Decongestants
- Nasal saline spray and/ or irrigation
- Antihistamines, in patients with concomitant allergic rhinitis
- Analgesics

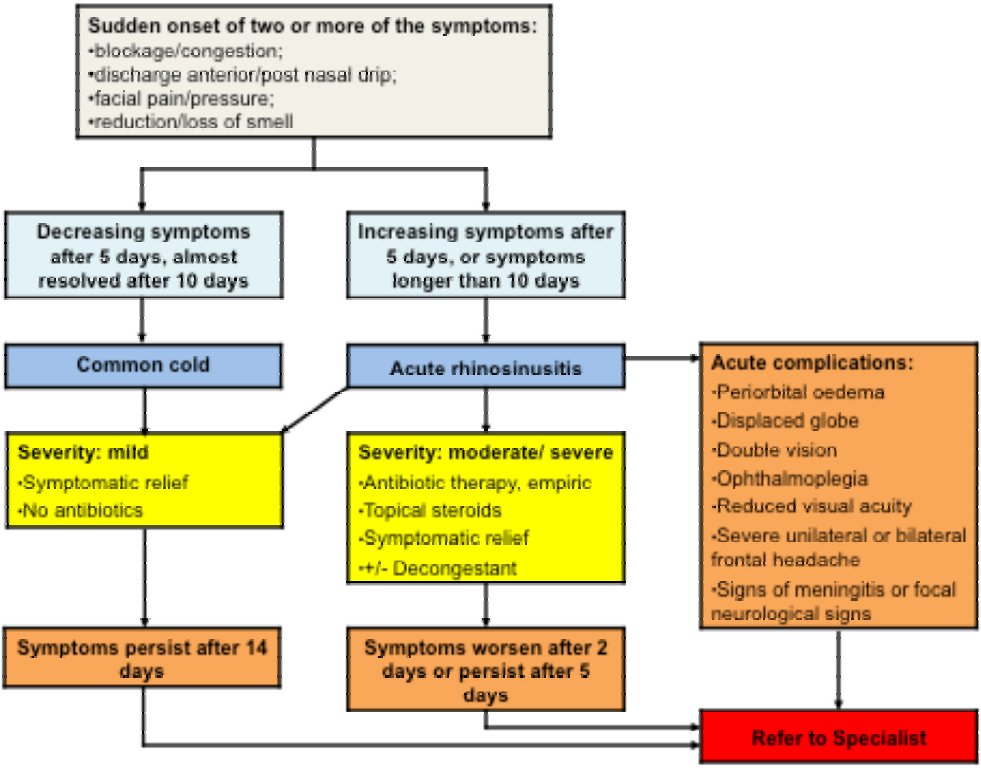
Grade D, Level 4

Specific recommendations on these treatments follow.

GPP The group recommends that patients with acute rhinosinusitis should be reviewed for **symptom resolution**. Patients whose symptoms worsen or persist despite therapy should be referred to a specialist for further evaluation and management.

GPP

Figure 2 Management scheme for primary care for adults with acute rhinosinusitis



Treatment for adults with acute rhinosinusitis

Antibiotics

The use of antibiotics in acute bacterial rhinosinusitis has been validated by meta-analysis. Penicillin group antibiotics have been shown to be superior to placebo. Newer non-penicillin antibiotics (macrolide or cephalosporin) have similar rates of cure or improvement when compared to penicillin, amoxycillin or amoxicillin-clavulanate.[19]

The choice of empiric antibiotic is determined by the prevalence and resistance patterns of bacteria based on local and published data. A local series of intracranial and orbital complications of acute sinusitis, found 67% and 75% of patients to have bacteria sensitive to amoxicillin and amoxicillin-clavulanate, respectively, whereas 96% were sensitive to a combination of amoxicillin-clavulanate and cloxacillin.[37]

Refer to chapter 2 for recommendations on antibiotics for adults with acute bacterial rhinosinusitis.

Nasal Corticosteroids

A Nasal steroid spray twice daily is recommended for adults with acute rhinosinusitis which has not resolved after 5 days of initial presentation.[38-44]

Grade A, Level 1+

The use of nasal steroid spray has been shown to help with symptoms of acute rhinosinusitis. As monotherapy, twice daily dosing was superior to amoxicillin and placebo in acute bacterial rhinosinusitis. Once daily dosing showed superiority to placebo but not to amoxicillin.[38]

The use of nasal steroid spray as an adjunct to antibiotics in the treatment of acute bacterial rhinosinusitis results in significant symptom improvement.[39-44]

Oral Corticosteroids

A Oral corticosteroids are not recommended for adults with acute rhinosinusitis.[45,46]

Grade A, Level 1+

There is limited data on the use of oral steroids in acute rhinosinusitis treatment. Two studies have shown that although there was initial symptom relief during the treatment, there was no significant difference between the treatment groups at the end of a 10 and 14 day course of antibiotics with or without short course of oral steroids.[45,46]

Anti-histamines

D Antihistamines are not recommended in the treatment of acute bacterial rhinosinusitis in adults.[26,47,48]

Grade D, Level 4

In adults, antihistamines might worsen the congestion by drying the mucosa.

A Antihistamines may be used as an adjunct to antibiotic treatment in acute bacterial rhinosinusitis patients with concomitant allergic rhinitis.[49]

Grade A, Level 1+

Nasal obstruction and sneezing were reduced as compared to controls in a clinical trial.[49]

D New generation oral antihistamines are preferred in adults with acute rhinosinusitis for their favourable efficacy/safety ratio and pharmacokinetics. Refrain from first generation antihistamines to avoid sedation and anti-cholinergic side effects.[48]

Grade D, Level 4

Topical Decongestants

GPP Topical decongestants may be used for adults with acute rhinosinusitis whose symptoms fail to resolve after 10 days of initial presentation.

GPP

After 10 days, unresolved acute bacterial rhinosinusitis is presumed to be significant.

Topical decongestants have significant effect on congestion of the inferior turbinate and ostiomeatal complex patency (middle turbinates and infundibular mucosa).

Clinical experience shows that drainage of persistent mucopus in established acute bacterial rhinosinusitis from the middle meatus is facilitated by topical decongestion. Intranasal decongestants act more rapidly and more effectively than oral decongestants.

GPP The duration of treatment with topical decongestants should be limited to less than 10 days to avoid rhinitis medicamentosa.

GPP

Nasal Saline Spray and/or Irrigation

A Nasal hypertonic saline irrigation, alone or in conjunction with other adjunctive measures, may be used to reduce symptoms and medication use in adults with frequent acute rhinosinusitis. [50]

Grade A, Level 1+

Hypertonic saline irrigation showed improvement in quality of life, decreased symptoms and decreased medication use in patients with frequent acute rhinosinusitis.[50]

Compared to isotonic saline, buffered hypertonic saline irrigation may have a superior anti-inflammatory effect and ability to thin mucous, and transiently improve nasal mucociliary clearance in healthy volunteers.[13] Moreover, hypertonic saline irrigation has been shown to improve mucociliary transport in chronic rhinosinusitis, while isotonic saline seemed to have a better effect on acute rhinosinusitis.[52]

However, hypertonic saline spray did not improve subjective symptom scores (congestion, secretion, and headache) and the duration to symptom resolution in patients with the common cold and acute rhinosinusitis, compared with isotonic saline, and no treatment. In this study, rhinosinusitis patients also received antibiotics.[37]

Mucolytics

D Mucolytics are not recommended to be prescribed routinely for adult patients with acute rhinosinusitis.[48]

Grade D, Level 4

Table 1 Treatment for adults with acute rhinosinusitis

Therapy	Recommendation
Oral antibiotics	Yes, after 5 days or in mod/severe acute rhinosinusitis
Nasal corticosteroid	Yes
Topical steroid and oral antiobiotic combined	Yes
Oral corticosteroid	No
Oral anti-histamines	Yes, only in allergic patients
Saline irrigation	Yes, as symptomatic relief
Decongestant	Yes, as symptomatic relief
Mucolytic	No

3.2 Chronic rhinosinusitis

3.2.1 Definition

Chronic rhinosinusitis is a group of disorders characterized by inflammation of the mucosa of the nose and paranasal sinuses of at least 12 consecutive weeks.[33]

3.2.2 Diagnosis

Symptoms present longer than 12 weeks.
Two or more symptoms, one of which should be either nasal blockage/obstruction/congestion or nasal discharge (anterior/posterior nasal drip):
± Facial pain/pressure
± Reduction or loss of smell[33]

Common factors associated with chronic rhinosinusitis:

- Micro-organisms – viral, bacterial, fungal
- Allergy
- Nasal anatomical variants causing obstruction
- Mucociliary dysfunction – congenital and acquired
- Immunodeficiency
- Noxious chemicals and pollutants, including cigarette smoke
- Dental disease
- Asthma
- Aspirin sensitivity

This list is by no means exhaustive.

GPP All adults with persistent and recurrent rhinosinusitis should be referred to a specialist for nasal endoscopy to assess for differential causes.

GPP

GPP Other diagnosis should be considered in adults with chronic rhinosinusitis who present with unilateral symptoms of bleeding, crusting, or cacosmia.

GPP

D Immediate referral to an ENT specialist is indicated for chronic rhinosinusitis in adults who present with sinister signs[33] such as:

- Peri-orbital oedema
- Displaced globe
- Double vision
- Ophthalmoplegia
- Reduced visual acuity
- Severe unilateral or bilateral frontal headache
- Frontal swelling
- Signs of meningitis or focal neurological deficits

Grade D, Level 4

Imaging

D Sinus x-rays are **not** recommended to support the diagnosis of chronic rhinitis in adults.[33]

Grade D, Level 4

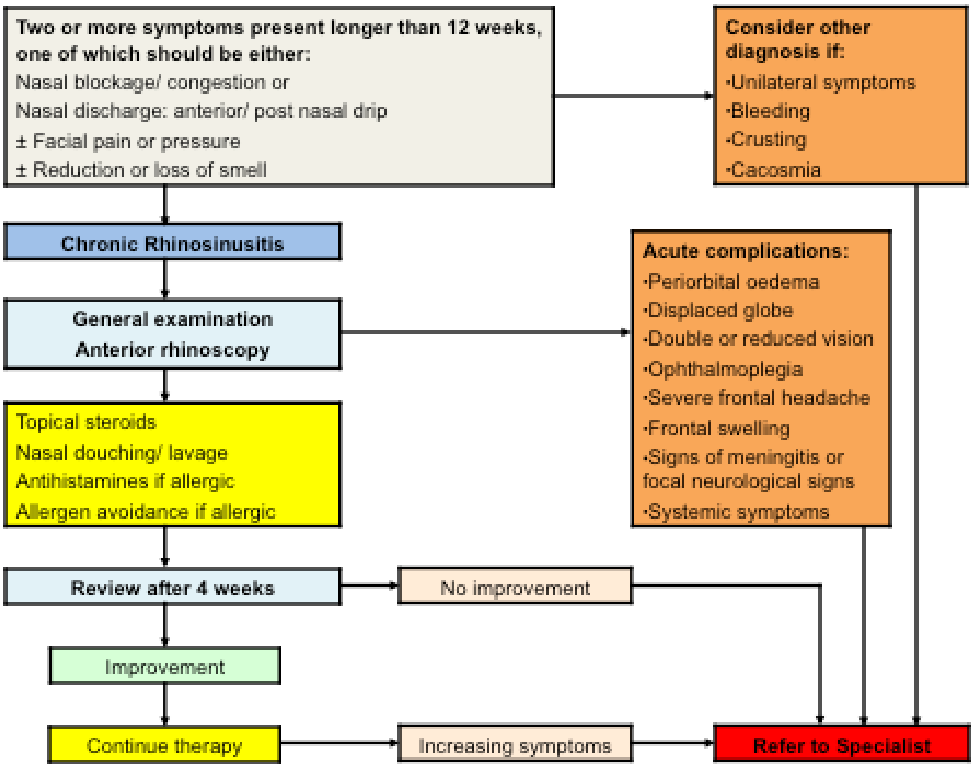
Specialist management of chronic rhinosinusitis includes serial endoscopic surveillance, microbial isolation, allergy testing, immunodeficiency screening, long-term pharmacotherapy, CT scan evaluation of the paranasal sinuses, and endoscopic sinus surgery.

3.2.3 Principle of treatment

The goals of medical treatment are:

- Alleviate symptoms
- Treat underlying inflammatory process and return sinuses back to health; and
- Prevent the development of acute complications

Figure 3 Management scheme for primary care for adults with chronic rhinosinusitis



Treatment of chronic rhinosinusitis without nasal polyps

D For chronic rhinosinusitis without nasal polyps, alleviate symptoms with the following options:

- Nasal saline irrigation

Treat underlying inflammatory process with:

- Intranasal steroid
- Antibiotic, in patients with acute exacerbation of chronic rhinosinusitis, culture directed: 10-14 days[33]

Grade D, Level 4

Short-term oral antibiotic therapy

C Short-term oral antibiotics are recommended for acute exacerbation of chronic rhinosinusitis without nasal polyps.[53-55]

Grade C, Level 2+

In chronic rhinosinusitis, the role of bacteria is still not well established. Bacteria present may be infective, as super antigens or just as colonizers of the sinuses. The use of short-term antibiotics in chronic rhinosinusitis without nasal polyps has not been validated by meta-analysis, or placebo-controlled studies available. However, several open trials have shown that oral antibiotics improve the symptomatology of acute exacerbation of chronic rhinosinusitis.[53-55] Studies have shown clinical responses to short-term antibiotics of up to 14 days duration, in 56% to 95% of patients.[53,54]

Long-term oral macrolide therapy

Use of long-term, low-dose marcolide therapy has been shown to be beneficial with improvement of symptoms of 60% to 80% only in the Japanese population.[56,57] The exact mechanism of action is still unknown.

In selected cases, when topical steroids and a short course of antibiotics have failed, long term low dose macrolides have been reported to have been effective in a subpopulation of patients with chronic rhinosinusitis*.

* Wallwork et al. A double-blind, randomized, placebo-controlled trial of macrolide in the treatment of chronic rhinosinusitis. Laryngoscope. 2006 Feb;116(2):189-93.

* Ragab SM. Evaluation of the medical and surgical treatment of chronic rhinosinusitis: a prospective, randomised, controlled trial. Laryngoscope. 2004 May;114(5):923-30.

Nasal corticosteroids

A Nasal corticosteroids may be prescribed for chronic rhinosinusitis without nasal polyps.[56,57]

Grade A, Level 1+

The use of nasal steroids has shown significant improvement in nasal symptom score and inspiratory peak flow.[56,57]

Nasal saline irrigation

A Nasal saline irrigation may be prescribed for chronic rhinosinusitis without nasal polyps.

Grade A, Level 1+

The use of isotonic saline irrigation for 7 days in the treatment of chronic rhinosinusitis showed improvement in subjective complaints, endoscopic findings, and radiological results.[58] The use of hypertonic saline irrigation, over standard treatment, showed improvement in endoscopic appearances, quality of life[59], sinus-related symptoms, and decreased medication use[60] in patients with chronic rhinosinusitis.

GPP Oral steroids, oral/topical decongestants, mucolytics or antihistamines are not recommended in treatment of chronic rhinosinusitis without nasal polyps.

GPP

Oral corticosteroids

There is no evidence-based data to support the use of oral steroids in the treatment of chronic rhinosinusitis without nasal polyps.

Anti-histamines

There are no controlled trials to show evidence of beneficial effects of anti-histamines therapy for chronic rhinosinusitis without nasal polyps.

Mucolytics

Though mucolytics are commonly prescribed as an adjunct to antibiotic treatment, there is insufficient data to draw a conclusion on the benefits of mucolytics in acute rhinosinusits. There are no controlled trials to suggest that mucolytics are beneficial in the treatment of chronic rhinosinusitis without nasal polyps.

Decongestants

The use of decongestants in treatment of chronic rhinosinusits without nasal polyps has not been evaluated in a randomized controlled trial.

Table 2 Treatment for adults with chronic rhinosinusitis without nasal polyps

Therapy	Recommendation
Short-term oral antibiotic therapy	Yes, in acute exacerbation of chronic rhinosinusitis
Long-term macrolide therapy	Yes
Nasal corticosteroid therapy	Yes
Oral steroid therapy	No
Nasal saline irrigation	Yes
Oral/topical decongestants	No
Mucolytics	No
Anti-histamines	No

Treatment of chronic rhinosinusitis with nasal polyps

D For chronic rhinosinusitis with nasal polyps, alleviate symptoms with the following options:

- Nasal saline irrigation
- Anti-histamines, in patients with concomitant allergic rhinitis

Treat underlying inflammatory process with:

- Intranasal steroid.[33]

Grade D, Level 4

GPP Adults with chronic rhinosinusitis with nasal polyps should be reviewed for symptom control. Patients whose symptoms worsen during or persist despite therapy should be referred to a specialist for further evaluation and management.

GPP

Short-term oral antibiotic therapy

C Short-term oral antibiotics are recommended to improve symptoms in acute exacerbation of chronic rhinosinusitis with nasal polyps.

Grade C, Level 2+

There are no placebo-controlled trials with evidence of beneficial effects of the use of antibiotics in treatment of chronic rhinosinusitis with nasal polyps. However, several open trials have reported that short-term oral antibiotics improve the symptomatology of acute exacerbation of chronic rhinosinusitis.[53-55]

Long-term oral macrolide therapy

C Long-term, low-dose macrolide therapy may be considered for chronic rhinosinusitis patients with nasal polyps.[56,57,61]

Grade C, Level 2+

Benefits have been reported with long-term, low-dose macrolide therapy for chronic rhinosinusitis with nasal polyps, in patients when corticosteroids fail.[61,62]

GPP Management by a specialist is recommended for patients with chronic rhinosinusitis with nasal polyps being prescribed long term, low dose macrolide therapy, in view of its side effects.

GPP

Nasal Corticosteroids

A Nasal corticosteroid therapy may be used in adults with chronic rhinosinusitis with nasal polyps.[63-68]

Grade A, Level 1+

Placebo controlled studies on nasal corticosteroids in the treatment of chronic rhinosinusitis with nasal polyps have demonstrated over periods of 4-26 weeks, reduced nasal symptom scores, improved peak nasal inspiratory flow, and decreased polyp size.[63-68] However, the effect on improvement in the sense of smell is inconsistent.

Oral corticosteroids

There are no studies performed on single treatment with oral corticosteroids for chronic rhinosinusitis with nasal polyps. Furthermore, placebo-controlled, and dose-effect studies are also

lacking. However, there is clinical acceptance from several open studies that oral corticosteroids are effective in shrinkage of polyps, reducing nasal symptoms, and improving the sense of smell.[63,69-71]

Although widely prescribed pre-operatively, there is an absence of experimental data to support the use of oral corticosteroids. Oral corticosteroid therapy, especially if long-term, has potential side effects and should preferably be administered and monitored under specialist care.

Antihistamines

C Antihistamines are not recommended in chronic rhinosinusitis with nasal polyps.

Grade C, Level 2+

Cetirizine does not have an effect on polyp size.[72]

Table 3 Treatment for adults with chronic rhinosinusitis with nasal polyps

Therapy	Recommendation
Short-term oral antibiotic therapy	Yes, in acute exacerbation of chronic rhinosinusitis
Long-term macrolide therapy	Yes
Topical steroid therapy	Yes
Oral steroid therapy	Yes
Nasal saline irrigation	Yes, as symptomatic relief
Oral/topical decongestants	No
Mucolytics	No
Systemic anti-histamines	No, except for allergy

4 Management of infective rhinosinusitis in children

4.1 Introduction

Rhinosinusitis is common but challenging to manage in children. Issues of special concern are how to obtain an accurate diagnosis, the extent of investigations required, and the relative lack of high level evidence on effectiveness and safety of long-term medical and surgical therapy.

This section on Paediatric Rhinosinusitis follows closely the recommendations of the European Position Paper on Rhinosinusitis and Nasal Polyposis 2007.[33]

4.2 Epidemiology

In an MRI study of a non-ENT paediatric population, the prevalence of children with signs of sinusitis was 45%. This increases to 80% with bilateral mucosal swelling on rhinoscopy, and 100% with purulent secretions.[73]

Children at higher risk include:
1. Those 2-8 years of age, when an immature immunity system and adenoid hypertrophy are more common.
2. Those with allergic rhinitis.
3. Those attending day care centres.

4.3 Bacteriology

The common pathogens in acute rhinosinusitis are *Streptococcus pneumoniae, Haemophilus influenzae*, and *Moraxella catarrhalis*. These pathogens isolated from the maxillary sinuses correlated well with middle meatal (83%), but not nasopharyngeal cultures.[74]

4.4 Diagnosis

A detailed medical history and clinical examination is important.

4.5 History

4.5.1 Acute rhinosinusitis

Definition
Sudden onset of two or more symptoms, one of which should be either nasal blockage or nasal discharge (anterior/posterior nasal drip), with or without facial pain/pressure, and with or without reduction of smell. Fever and pain are more often associated with acute rhinosinusitis than chronic rhinosinusitis. There is complete resolution of symptoms within 12 weeks.

Differences between acute rhinosinusitis and common cold

Acute rhinosinusitis is suspected when[32]:
1. Signs and symptoms of a cold persist beyond 10 days (nasal discharge and day-time cough worsening at night).
2. A cold seems more severe than usual (high fever, copious purulent discharge, peri-orbital oedema and pain).
3. A cold worsens after several days of improvement (with or without fever).

4.5.2 Chronic rhinosinusitis

Definition
Symptoms are the same as acute rhinosinusitis, but there is no complete resolution of symptoms by 12 weeks. Acute-on-chronic exacerbations are possible.

GPP Allergic rhinitis often coexists with paediatric acute and chronic rhinosinusitis. The history should evaluate for symptoms of allergic rhinitis and identify possible allergens.

GPP

4.6 Clinical examination

Paediatric acute rhinosinusitis or chronic rhinosinusitis is frequently associated with otitis media with effusion. Recurrent otitis episodes can impact hearing, speech, language development, and may require placement of grommet tubes.

GPP Otoscopy should be performed routinely to exclude otitis media in paediatric acute and chronic rhinosinusitis.

GPP

Complications of acute rhinosinusitis can develop rapidly in a child. Eye swelling from orbital infection can occur without pain in the eye or any history of rhinosinusitis.[75] Complications like osteomyelitis, intracranial infection and cavernous sinus thrombosis are also possible. Any change in sensorium, extreme lethargy or spiking fevers should prompt a suspicion of intracranial infection.

4.7 Investigations

1. Culture and sensitivity analysis

Swabs of nasal discharge from middle meatus or maxillary antrum are obtained in[76]:

- severe illness or toxicity
- acute illness failing 48-72 hours of medical therapy
- immuocompromised patients
- intra-orbital or intracranial abscess complications

Careful decongestion of the middle meatal area usually allows mucopus from the sinus to be cultured without the need for antral puncture. In children younger than 7 years old, the floor of the maxillary sinus remains above the level of the floor of the nose, increasing the risk of damaging the tooth roots during an antral puncture.

2. Imaging

D Plain X-ray is not recommended routinely to confirm the diagnosis of rhinosinusitis in children.[33,77]

Grade D, Level 4

Van der Veken et al reported that plain x-ray is not sensitive, with unnecessary radiation exposure.[78] Transillumination is also not useful under 10 years of age.[77]

3. The following conditions are associated with recalcitrant cases.

a. Allergic rhinitis

The association between allergy and chronic rhinosinusitis remains controversial. However, children with allergy have more upper respiratory tract infections.[79]

Children with a positive history of allergy are further evaluated for inhalant and food allergies.[80]

b. Immunocompromised state

Recurrent or chronic rhinosinusitis is the most common clinical presentation of common variable immunodeficiencies.[81] Primary deficiencies include secretory IgA and IgG subclass antibody deficiencies. Secondary immunocompromise related to organ transplants, AIDS, malignancies and drugs is possible. In immunocompromise states, unusual or resistant micro-organisms and fungi are more common.

c. Laryngopharyngeal reflux

Laryngopharyngeal reflux can cause chronic cough, hoarseness and even stridor. In 30 children with chronic sinus disease, 63% had esophageal reflux and 32% had nasopharyngeal reflux.[82]

The 24-hour pH probe is the gold standard diagnostic tool for acid reflux, but will miss a diagnosis of alkaline reflux.

d. Cystic Fibrosis

Cystic fibrosis is uncommon in Singapore. It is more common in non-Hispanic Caucasians and Ashkenazi Jews. Sinusitis and nasal polyps were found in more than 50% of patients with cystic firbrosis.[83] Nasal polyposis in chronic rhinosinusitis should prompt a suspicion of cystic fibrosis.

e. Primary Ciliary Dyskinesia

It is also rare in Asians. However, rhinitis at birth in an otherwise well child, atypical recalcitrant asthma, chronic wet cough, very severe gastro-oesophageal reflux, bronchiectasis, rhinosinusitis, chronic severe secretory otitis media (especially post grommet tubes), and Kartegener's syndrome (situs inversus, bronchiectasis and chronic rhinosinusitis) should prompt a suspicion of primary ciliary dyskinesia.[84]

4.8 Pharmacotherapy

Principles of medical therapy are:
1. To control symptoms
2. To reduce underlying nose and sinus inflammation
3. To eradicate pathogens

The workgroup adopted recommendations from the European Position Paper on Rhinosinusitis and Nasal Polyposis (EPOS). However, decisions for individual patients should be specifically tailored.

4.9 Management of paediatric acute rhinosinusitis

Usually, only symptomatic treatment is needed.

1. Antibiotics

Refer to chapter 2 for recommendations on antibiotics in children with acute bacterial rhinosinusitis.

Cochrane meta-analysis[85] of antibiotics for persistent nasal discharge concluded that antibiotics for 10 days reduced the persistence of acute rhinosinusitis in the short to medium term. For 8 children treated, only 1 additional child would be cured (NNT 8, 95% CI 5 to 29). No long term benefits were documented.[86]

2. Topical corticosteroids

A Topical corticosteroids may be used in children as an adjunct to antibiotics. It can reduce the cough and nasal discharge earlier in acute bacterial rhinosinusitis.[87]

Grade A, Level 1+

3. Topical or oral decongestants

GPP Topical decongestants should be used in children no longer than 4-5 days to avoid toxicity and rhinitis medicamentosa.

GPP

No benefit has been shown, though Alpha-2 agonists xylometazoline and oxymetazoline are commonly used in acute rhinitis.

A double-blind, randomized controlled trial showed no additive effect of adding oral decongestant-antihistamine to amoxicillin.[88]

4. Nasal douching

D Saline nose drops or sprays may be considered to decrease the mucus trapping and crusting associated with acute rhinosinusitis in children.[79]

Grade D, Level 3

Figure 4 (pg 46) showed the summary of treatment evidence and recommendations for children with acute rhinosinusitis[33]

4.10 Management of paediatric chronic rhinosinusitis

Most cases of paediatric chronic rhinosinusitis resolve spontaneously.[89]

There is a significant paucity of data on specific treatment of chronic rhinosinusitis in children.

1. Antibiotics

The benefit of antibiotics has been shown only in acute bacterial rhinosinusitis as described earlier. The only study addressing antibiotics in paediatric chronic rhinosinusitis[90] did not show any benefit.

D The workgroup recommends antibiotics use only in acute exacerbation of paediatric chronic rhinosinusitis, by following the recommendations from the Consensus Meeting in Brussels, 1996[31]:

- For chronic rhinosinusitis, especially with frequent exacerbations, 2 weeks of oral antibiotics is advised. The antibiotic is changed if there is no response within 5-7 days.
- Failing this, sinus secretions for culture or investigations to exclude recalcitrant causes are considered.
- If there is slow response, a second 2-week course can be prescribed.
- In rare cases with clear-cut improvement but persisting symptoms, a 3rd course can be given before surgery is considered.
- Parenteral antibiotic may be appropriate if oral antibiotics fail.

Grade D, Level 4

2. Topical corticosteroids

Many studies show that topical corticosteroids are effective and safe in children with rhinitis, and it is assumed that this similarly applies for chronic rhinosinusitis. There is no data on the efficacy of topical corticosteroids in paediatric chronic rhinosinusitis specifically.

3. Nasal douching

C Nasal douching may be considered for paediatric chronic rhinosinusitis.[91,92]

Grade C, Level 2+

Nasal douching was effective in 2 small randomized studies. Hypertonic or normal saline were equally effective.[91,92]

4. Reflux therapy

Gastro-oesophageal reflux (GER) is treated in chronic rhinosinusitis before any surgical intervention. In children with chronic rhinosinusitis and gastro-oesophageal reflux proven by 24-hour pH monitoring, reflux therapy improved sinus disease.[82] Reflux therapy avoided surgery in 89 % of children with chronic rhinosinusitis.[93]

4.11 Surgical therapy

A. Functional Endoscopic Sinus Surgery (FESS)

A meta-analysis showed positive outcomes of 88-92 % with average follow-up of 3.7 years, concluding that FESS is a safe and effective treatment for chronic rhinosinusitis.[94] However, outcomes were based on symptomatic relief, not endoscopic examination or CT scan.

B. Adenoidectomy

This is still controversial in paediatric chronic rhinosinusitis. Recently, it has been suggested that adenoidectomy is safe and effective, and should be performed before functional endoscopic sinus surgery (FESS), especially in younger children with obstructive symptoms.[95]

Outcomes are based on symptomatic relief, not endoscopic examination or CT scan. A meta-analysis showed positive outcomes of 88-92 % with average follow-up of 3.7 years, concluding that FESS is a safe and effective treatment for chronic rhinosinusitis.[94]

C. Other interventions

D Antral lavage, inferior meatal antrostomy (except possibly in primary ciliary dyskinesia), Caldwell-Luc operation (risks damage to un-erupted teeth)[74,79,96] are not recommended in paediatric chronic rhinosinusitis.

Grade D, Level 3

Figure 5 (pg 47) showed the summary of clinical management scheme for children with chronic rhinosinusitis.[33]

Figure 4 Summary of treatment evidence and recommendations for children with acute rhinosinusitis[33]

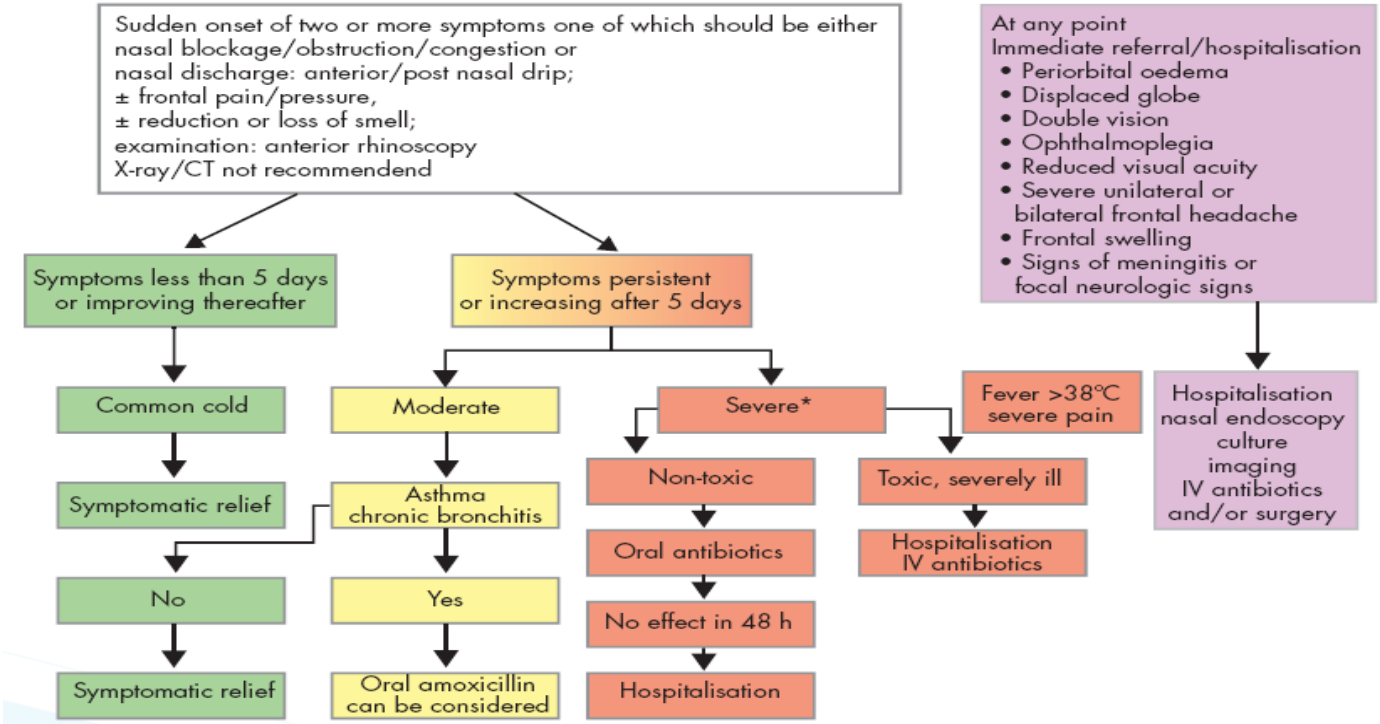
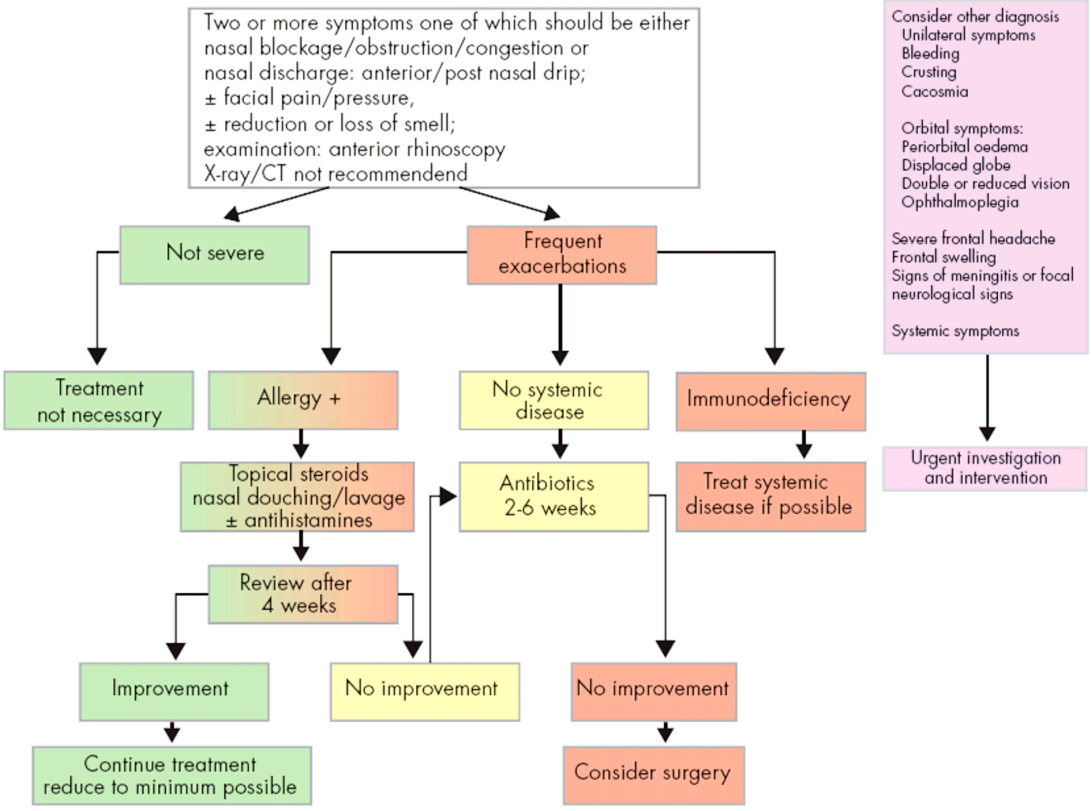


Figure 5 Summary of clinical management scheme for chronic rhinosinusitis in children[33]



5 Management of allergic rhinitis

5.1 Diagnosis

Allergic rhinitis is a symptomatic disorder of the nose, induced-after allergen exposure by an IgE mediated inflammation of the membranes lining the nose, resulting in the cardinal symptoms of sneezing, nasal obstruction, anterior or posterior rhinorrhoea and/or itching.

These symptoms occur during two or more consecutive days for more than one hour in most days.

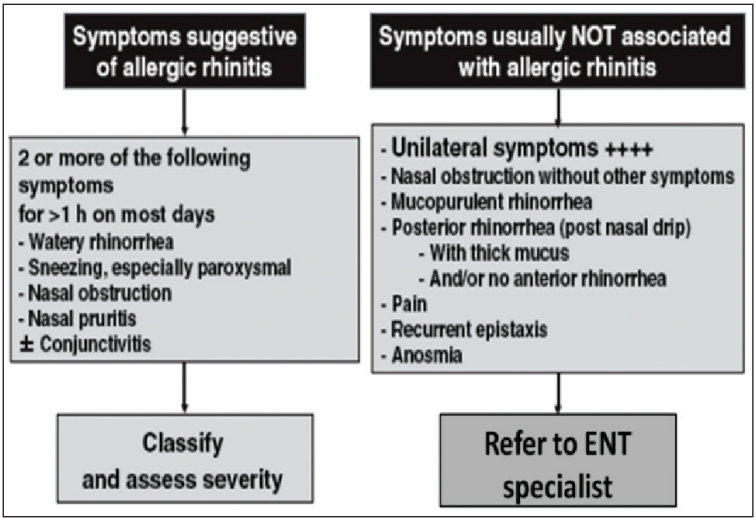
GPP The diagnosis of allergic rhinitis should be made based upon concordance between a typical history of allergic symptoms and diagnostic tests.

GPP

D The workgroup recommends using the algorithm for the diagnosis and assessment of severity of allergic rhinitis proposed by ARIA 2008 (refer to Figure 6).

Grade D, Level 4

Figure 6 Symptoms of allergic rhinitis



(Adapted with permission from ARIA 2008 Update)

GPP Besides a nasal examination for allergic rhinitis, look out for:

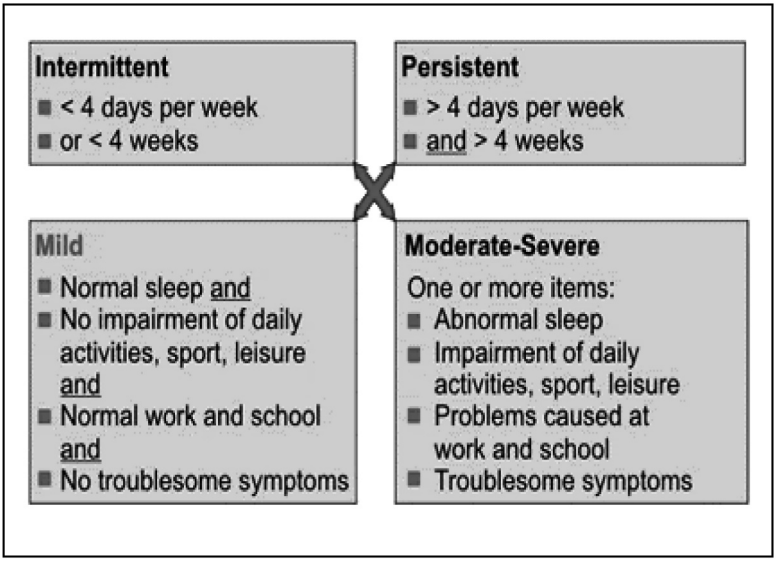
- Ocular signs of irritation e.g. allergic conjunctivitis; redness and rubbing of eyes indicative of itchiness.
- Chest examination to rule out concurrent asthma.

GPP

D The workgroup recommends using the algorithm for the classification of allergic rhinitis proposed by ARIA 2008 (refer to Figure 7 below).

Grade D, Level 4

Figure 7 Classification and severity of allergic rhinitis



(Reproduced with permission from ARIA 2008 Update)

5.2 Management

This encompasses the following measures:

- Pharmacotherapy
- Avoidance of allergen
- Allergen specific immunotherapy
- Patient education

In the treatment of allergic rhinitis, one should consider the severity and duration of the disease, the patient's preference, the safety measures, as well as the efficacy, availability and cost of medications.

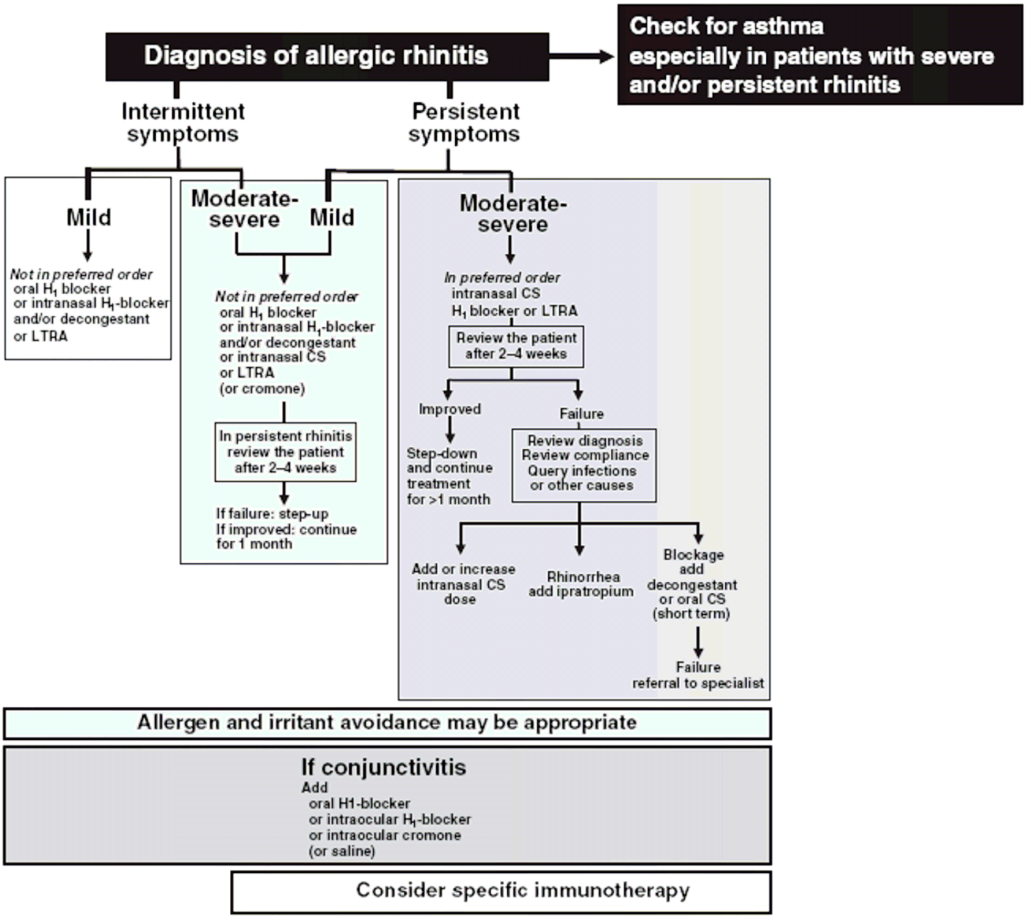
A stepwise approach depending on the severity and duration of rhinitis is proposed.

Not all patients with moderate/severe allergic rhinitis are controlled despite optimal pharmacotherapy.

D The workgroup recommends using the algorithm for the management of allergic rhinitis proposed by ARIA 2008 (refer to Figure 8, pg 51).

Grade D, Level 4

Figure 8 Algorithm for management of allergic rhinitis



(Reproduced with permission from ARIA 2008 Update)

5.2.1 Environmental control (inhalant-allergen avoidance)

GPP Mattress encasings or High Efficiency Particulate Air Filters for house dust mite and pet allergy in adults with rhinitis should be part of the overall management of allergic rhinitis.

GPP

A range of inhalant allergens has been associated with allergic rhinitis, of which house dust mite (HDM) is the most important locally and most investigated. Although the general consensus is that allergen avoidance should lead to an improvement of symptoms, studies have shown that the majority of single preventive measures of indoor allergen control fail to achieve a clinically relevant improvement of asthma and rhinitis.

5.2.2 Pharmacotherapy of allergic rhinitis

A Second-generation oral or intranasal H1-antihistamines are recommended for the treatment of allergic rhinitis and conjunctivitis in adults and children.[97-99]

Grade A, Level 1++

First-generation oral H1-antihistamines tend to have sedative effects and should be used with care.

A Intranasal glucocorticosteroids are strongly recommended for the treatment of allergic rhinitis in adults and children.[100-102]

Grade A, Level 1++

D Intramuscular glucocorticosteroids and the long term use of oral preparations are not recommended for the treatment of allergic rhinitis due to safety concerns.[103]

Grade D, Level 3

A Topical H1-antihistamines are recommended for the treatment of allergic rhinitis and conjunctivitis. Its therapeutic effects are superior and faster than oral anti-histamines.[104,105]

Grade A, Level 1+

A Intranasal ipratropium may be considered as a treatment option for rhinorrhoea associated with allergic rhinitis.[106,107]

Grade A, Level 1+

A Topical chromones should be considered as a treatment option for allergic rhinitis and conjunctivitis. However, they are only moderately effective.[108-114]

Grade A, Level 1+

A Montelukast may be considered as a treatment option for seasonal allergic rhinitis and asthma in patients over 6 years of age. It should not be used more than 4 weeks since there is limited data of its efficacy in patients with persistent allergic rhinitis for more than 4 weeks.[115-123]

Grade A, Level 1+

C Intranasal decongestants may be used for a short period of time in patients with severe nasal obstruction caused by allergic rhinitis.[124-130]

Grade C, Level 2+

C Oral decongestants (and their combination with oral H1-antihistamines) may be considered in the treatment of allergic rhinitis in adults, but side effects are common.[12]

Grade C, Level 2++

Complementary/ alternative medicine appear to be satisfactory for allergic rhinitis patients, but it lacks evidence based level of recommendations.[131-136]

5.2.3 Allergen-specific immunotherapy: therapeutic vaccines for allergic diseases

Allergen-specific immunotherapy is the practice of administering gradually increasing quantities of an allergen extract to an allergic subject to ameliorate the symptoms associated with the subsequent exposure to the causative allergen.

It induces clinical and immunologic tolerance, has long-term efficacy, improves the quality of life, and may prevent the progression of allergic disease.

There is sound evidence that subcutaneous immunotherapy using inhalant allergens is clinically effective in the treatment of allergic rhinitis and asthma for pollen and mite allergy in both adults and

children, but it is burdened by the risks of side effects which may be life-threatening.

Sublingual immunotherapy is effective for the treatment of pollen and mite allergy in adults and children.

5.2.4 Education

GPP Education of patient and/or patient's carer on the management of allergic rhinitis should be considered as an option to maximize compliance and optimize treatment outcomes.

GPP

5.2.5 Surgical intervention

Surgery is not a modality for treatment of allergic rhinitis. However, it may be used as an adjunctive intervention in few highly-selected patients such as the relief of nasal obstruction due to persistent turbinate hypertrophy, cartilaginous or bony obstruction of the nasal airways or secondary sinus disease.

5.3 Paediatric aspects of allergic rhinitis

Allergic rhinitis is the most prevalent chronic allergic disease in children. It can significantly affect the child's quality of life, and may exacerbate a number of common co-morbidities, including asthma and sinusitis.

Allergic and non-allergic rhinitis are often difficult to differentiate based on symptoms. 50% of childhood rhinitis is induced by allergy.[137]

Inhalant allergens may play an important role in the early development of asthma. However, in preschool children, in contrast to older children, allergic rhinitis occurs at the same time or later than asthma. Sensitization to indoor allergens occurs early in life. Not all children with an allergic sensitization will have atopic disease or develop symptoms after exposure to an allergen.

It is important to note that epidemiology, diagnosis, and treatment of paediatric allergic rhinitis significantly differ between preschool and older children.

The prevalence of allergic rhinitis in preschool children is 4%.[138] By the age of 6, doctor-diagnosed allergic rhinitis may occur in more than 40% of children.[139]

5.3.1 Diagnosis

GPP Symptoms of sneezing, nasal itching, discharge and congestion that persist longer than 2 weeks should prompt a search for a cause other than infection in children.

GPP

Children with moderate/severe allergic rhinitis may develop noisy breathing, repeated throat clearing, snoring and sleep apnea, loss of olfaction and taste, have allergic salute or an allergic transverse nasal crease, malaise and disturbed nocturnal sleep with subsequent daytime fatigue. Co-morbidities associated with allergic rhinitis in children include asthma, atopic dermatitis/eczema, allergic conjunctivitis, chronic sinusitis and chronic otitis media with effusion.

GPP It is recommended to ask about family history of atopy and progression of atopy of the child.

GPP

B Skin prick tests should be performed and interpreted reliably early in life.[140]

Grade B, Level 2+

Positive tests to food allergens in infancy may predict a later development of sensitization to inhaled allergens.

5.3.2 Treatment

The goal of treatment is to control the symptoms, improve the child's ability to function and prevent the complications of allergic rhinitis.

Allergic rhinitis and asthma are commonly present together in preschool and school children. It is therefore important to carefully

assess the side effects of treatments, especially in children with both rhinitis and asthma.

GPP The principles of treatment are the same in children as in adults with allergic rhinitis, but dosages should be adapted and care should be taken to avoid the side effects involving impairment of growth and cognitive development.

GPP

GPP Pharmacologic management for allergic rhinitis in children should be individualized and polypharmacy avoided.

GPP

5.3.2.1 Pharmacologic treatment

Glucocorticosteroids

A Intranasal glucocorticosteroid with bioavailability of <1% such as fluticasone propionate or mometasone furoate should be considered as a treatment option for allergic rhinitis and allergic conjunctivitis in children.[141-144]

Grade A, Level 1++

Mometasone furoate is available for children of 2 years and above. Fluticasone propionate is approved for children aged 4 years and older and other intranasal glucocorticosteroids may be used in those over the age of 5 years.[145,146]

B Intranasal glucocorticosteroids with high bioavailability such as betamethasone should not be used in children with allergic rhinitis due to its effect upon growth and growth velocity.[145-147]

Grade B, Level 1++

Present day intranasal glucocorticosteroids do not appear to have an effect on the hypothalamic-pituitary-adrenal-axis in children.[148]

A Oral and depot glucocorticosteroid preparations should be avoided in children with allergic rhinitis due to negative effect on short term growth and growth velocity.[141,149]

Grade A, Level 1+

H_1-antihistamines

First-generation oral H_1-antihistamines, which are often included in the formulations of oral decongestants, have central nervous system side effects, including sedation, fatigue, paradoxical hyperactivity, insomnia, irritability and may further reduce the cognitive function of children with allergic rhinitis.

A Second generation H1-antihistamines such as cetirizine, levocetrizine and loratadine should be considered as a treatment option in the treatment of allergic rhinitis in children.[150-152]

Grade A, Level 1+

Second-generation H_1-antihistamines are effective and safe in the treatment of allergic rhinitis in children, in particular, cetirizine, levocetirizine and loratadine.[150-152]

Intranasal H_1-antihistamines like levocabastine and azelastine have rapid onset of action and few adverse effects in children with allergic rhino-conjunctivitis.[152-155]

Disodium cromoglycate is safe and effective for allergic rhino-conjunctivitis in children. However, a dosage of four to six times a day is required for cromoglycate, and compliance with treatment is often difficult.[154,156,157]

GPP Nasal saline drops or spray may be considered in children with allergic rhinitis to clear the nose before eating or sleeping.

GPP

Immunotherapy

Allergen-specific immunotherapy can reduce allergic rhinitis symptoms, alter natural course of the disease and induce long term clinical remission.

A Sublingual immunotherapy (SLIT) should be considered in children above age 5 years who have poor symptomatic control of allergic rhinitis despite maximal therapy or who cannot or will not take medication.[158-160]

Grade A, Level 1++

Studies[158-160] have shown that it is effective in young children with allergic rhinitis with only mild and transient local side effects. It may also possibly prevent a later development of asthma.

It can be administered safely at home, has greater acceptance by parents and children, and is well adapted for poly-sensitized patients (mites & pollen).

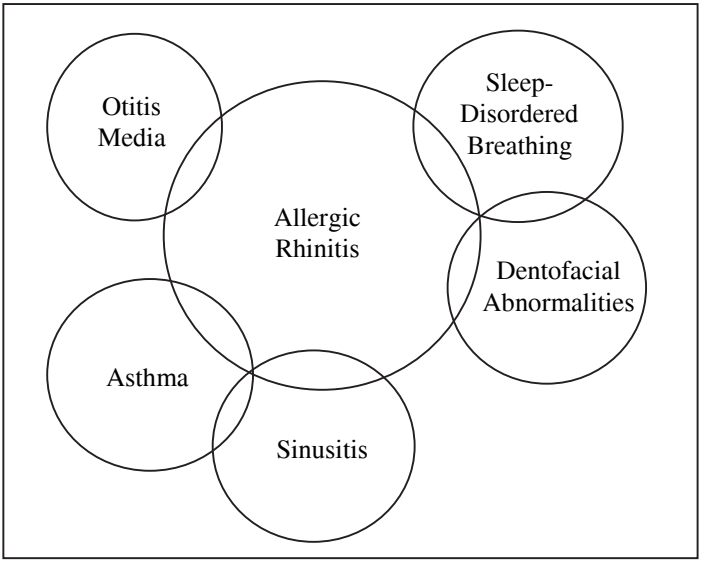
The medication dosing for paediatrics can be found in Appendix 1 (pgs 59-60).

5.3.2.2 Non-pharmacological treatment

GPP The family and the child should be educated about the recurrent or persistent nature of the disease, allergen avoidance and avoidance of allergen triggers and respiratory tract irritants, the most important of which is tobacco smoke.

GPP

Figure 9 Link between allergic rhinitis and other chronic disorders and complications



Appendix 1 Medication dosing for pediatrics

	Age range				
Medication	**<12 months**	**12-23 months**	**2-5 years**	**6-11 years**	≥12 years
Oral H_1 anti-histamines	**Cetririzine** 6-12 mo: 2.5 mg qd	**Cetirizine** 2.5 mg qd or bid	**Cetirizine** 2.5 or 5 mg qd or 2.5 mg bid **Loratadine** 5 mg qd	**Cetirizine** 5 or 10 mg qd **Fexofenadine** 30 mg qd **Loratadine** 10 mg qd	**Cetirizine** 5 or 10 mg qd **Desloratadine** 5 mg qd **Fexofenadine** 60 mg qd or 180 mg qd **Loratadine** 10 mg qd
H_1 anti-histamines nasal spray Corticosteroid nasal spray			**Azelastine** 5-11 yrs: 1 spray each nostril bid **Fluticasone propionate** 4-11 yrs: 1 or 2 sprays each nostril qd **Mometasone furoate** 1 spray each nostril qd	**Azelastine** 5-11 yrs: 1 spray each nostril bid **Budesonide** 6-12 yrs: 1 or 2 sprays each nostril qd **Flunisolide** 6-14 yrs: 1 spray each nostril tid or 2 sprays each nostril bid **Fluticasone propionate** 4-11 yrs: 1 or 2 sprays each nostril qd	**Azelastine** 2 sprays each nostril bid **Budesonide** >12 yrs: 1-4 sprays each nostril qd **Flunisolide** >14 yrs: 2 sprays each nostril bid-tid **Fluticasone propionate** 1 or 2 sprays each nostril qd or 1 spray each nostril bid

	Age range				
Medication	**<12 months**	**12-23 months**	**2-5 years**	**6-11 years**	**?12 years**
				Mometasone furoate 1 spray each nostril qd **Triamcinolone acetonide** 1 or 2 sprays each nostril qd	**Mometasone furoate** 2 sprays each nostril qd **Triamcinolone acetonide** 1 or 2 sprays each nostril qd
Leukotriene modifier			**Montelukast** 4 mg qd	**Montelukast** 6-14 yrs: 5 mg qd	**Montelukast** >14 yrs: 10 mg qd
Mast-cell stabilizer nasal spray			**Cromolyn sodium** 1 spray each nostril tid-qid	**Cromolyn sodium** 1 spray each nostril tid-qid	**Cromolyn sodium** 1 spray each nostril tid-qid
Anticholinergic nasal spray				**Ipratropium bromide 0.03%** 2 sprays each nostril bid-tid	**Ipratropium bromide 0.03%** 2 sprays each nostril bid-tid

Recommendation based on 2004 package inserts for each product.
Abbreviation: bid, twice a day; qd, once a day; qid, four times a day; tid, three times a day.

6 Management of rhinitis in pregnancy

Rhinitis may occur in 30% of pregnant women.[161]

1. Allergic rhinitis: the most common cause of rhinitis in pregnancy. It occurs in 18-30% of women in their childbearing age.[162]

2. Gestational or hormonal rhinitis: defined as nasal congestion for at least 6 weeks of pregnancy without signs of infection, tumor growth or known allergic causes. It occurs in approximately one-fifth of pregnancies during any gestational weeks and resolves within two weeks after the delivery.[163]

3. Infective rhinitis: only occurs in 1.5% of pregnant women and commonly presents as nasal congestion with purulent nasal discharge. Common pathogens identified are *Hemophilus influenzae* and *Streptococcus pnuemoniae*.

Diet may affect the prevalence of rhinitis in pregnancy. Fish, N-3 polyunsaturated fat, soya and isoflavones may reduce its prevalence.

Smoking, sensitization to house dust mites, and chronic sinusitis increase prevalence of rhinitis in pregnancy.

6.1 Diagnosis

D Nasal endoscopy on a decongested nose may be considered as an option to differentiate pregnancy rhinitis from sinusitis.[163]

Grade D, Level 4

D Imaging studies are not recommended to make a diagnosis in rhinitis in pregnancy.[33]

Grade D, Level 4

D Skin prick tests are not recommended for rhinitis in pregnancy because use of potent antigens in skin testing may be associated with systemic reactions.[164]

Grade D, Level 4

Treatment

GPP In treating rhinitis of pregnancy, all drug therapy should ideally be avoided especially in the first trimester. If drug therapy cannot be avoided then treatment will depend upon the predominant symptoms, with the topical agents as first line since they have minimal systemic exposure.

GPP

A. Supportive therapy

Supportive therapy includes simple treatment measures like avoidance of allergens, head elevation, nasal douching and reassurance that the condition is self-limiting. Nasal douching uses saline wash to help remove mucus from the nasal passageways improving discomfort and breathing. Saline washes also help lubricate the nasal mucosa.[165]

B. Pharmacotherapy

C Cromones are safe with no known teratogenic effect but they are moderately effective. It may be given for the treatment of rhinitis in the first 3 months of pregnancy, 3-4 times daily.[166,167]

Grade C, Level 2+

C If cromones are ineffective and poorly tolerated, they should be replaced with anti-histamines. Chlorpheniramine and tripelennamine are the anti-histamines of choice for pregnant women with rhinitis. Cetirizine and loratadine may be considered after the first trimester.[168-171]

Grade C, Level 2+

C Intranasal steroids should be prescribed as an alternative to or in combination with anti-histamines for severe cases of rhinitis in pregnancy.[166]

Grade C, Level 2+

C Budesonide is the only recommended intranasal steroid for rhinitis in pregnancy.[172,173]

Grade C, Level 2+

C Topical decongestants like oxymetazoline may be considered as second-line therapy for short-term relief and when no other safer alternatives are available for the treatment of rhinitis in pregnancy. [174]

Grade C, Level 2+

Studies on pregnant women using this drug showed no report of association with congenital abnormalities. [175,176]

C Oral decongestants are not recommended for rhinitis in pregancy.[177,178]

Grade C, Level 2+

C Leukotriene Modifiers are not recommended for allergic rhinitis in pregnancy.[179]

Grade C, Level 2+

The safety of leukotriene modifiers during pregnancy is not well established.

Antibiotics should only be used in infective rhinitis or sinusitis which is severe (painful, temperature >38.3° C) or persists after 10 days of symptoms from onset.[180]

A Amoxicillin is the drug of choice for pregnant patients with rhinitis who are not allergic to penicillin.[181]

Grade A, Level 1+

D Amoxicillin-clavulanate or cephalosporin may be given to pregnant women with rhinitis not responding to amoxicillin.[182]

Grade D, Level 3

C Metronidazole should be used in rhinitis in pregnancy caused by anaerobic pathogens.[183]

Grade C, Level 2+

D Immunotherapy is not recommended for rhinitis in pregnancy. However, it may be continued if the maintenance phase has been reached.[161,165,184]

Grade D, Level 4

Table 4 shows the list of drugs commonly used for the treatment of sinusitis and their US FDA Pregnancy Risk Category.

Table 4 Drugs commonly used in the treatment of rhiosinusitis in pregnancy[185]

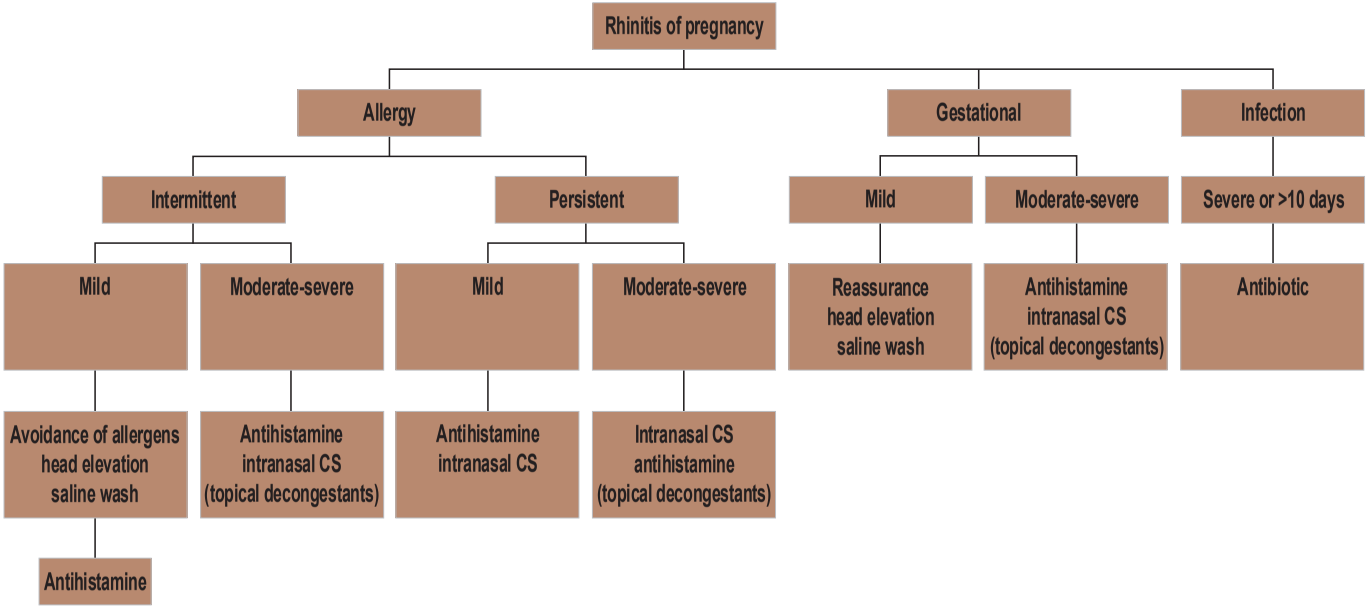
ANTIBIOTICS	FDA Pregnancy Risk Category
Ampicillin-sulbactam	B
Amoxicillin	B
Amoxicillin-clavulanate	B
Cefuroxime	B
Clarithromycin	C
Clindamycin	B
Erythromycin	B
Metronidazole	B

Table 5 shows the FDA Pregnancy Risk Category, an assessment of the risk of fetal injury when using certain drugs. These categories will help the physician in making a correct treatment decision. It is a must-know prior to giving any drugs to pregnant patients.

Table 5 US Food and Drug Administration Pregnancy Risk Category[186]

Category A	Adequate and well-controlled human studies have failed to demonstrate a risk to the fetus. Possibility of fetal harm seems remote
Category B	Controlled studies done on animals in reproduction do not indicate risk to the fetus. No adequate and well-controlled studies done on pregnant women.
Category C	Studies on animals show adverse effect and toxicity on fetus. No adequate and well-controlled studies done on pregnant women. But the benefits of these drugs may out weigh the potential risks in humans.
Category D	Positive evidence of human fetal risk exists, but benefits may outweigh the risks in certain situations.
Category X	Studies in animals or human beings have demonstrated fetal abnormalities. The risk of the use of drug in pregnant women clearly outweighs possible benefit. Contraindicated in pregnant women.

Figure 10 Treatment of rhinitis of pregnancy



Abbreviation:
CS - Corticosteroids

7 Cost-effectiveness issues

Allergic rhinitis imposes a substantial economic burden on society with indirect costs of productivity loss being larger than the direct health costs. It has been estimated that the burden of illness cost for allergic rhinitis ranges from US 2 to 5 billion dollars in USA.[186]

The many variables in the study of cost effectiveness of allergic rhinitis management such as identification of allergic rhinitis patients, differences in cost assignment, and difficulties in assigning indirect costs such as reduced productivity preclude formal cost effectiveness evaluations that compare incremental costs and benefits of alternative treatment strategies.[187]

Although there are presently no strong cost-effectiveness arguments available comparing each specific treatment option in allergic rhinitis, management in general is important in reducing a substantial economic burden on society.[188]

8 Clinical quality improvement

The following clinical quality improvement parameters, based on recommendations in these guidelines, are proposed:

Management of rhinosinusitis in adults

1. Percentage of patients who had plain sinus X-ray to diagnose rhinosinusitis. (Page 26)

2. Percentage of acute rhinosinusitis patients who received nasal steroid spray prior to commencement of antibiotics. (Page 29)

Management of rhinosinusitis in children

3. Percentage of children who had plain sinus X-ray to diagnose rhinosinusitis. (Page 43)

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Self-assessment (MCQs)

After reading the Clinical Practice Guidelines, you can claim one CME point under Category 3A (Self-Study) of the SMC Online CME System. Alternatively, you can claim one CME point under Category 3B (Distance Learning - Verifiable Self Assessment) if you answer at least 60% of the following MCQs correctly. You can submit your answers through the SMJ website at this link: http://smj.sma.org.sg/cme/smj/index.html. The answers will be published in the SMJ May 2010 issue and at the MOH webpage for these guidelines after the period for submitting the answers is over.

Instruction: Choose "True" or "False.

		True	False
1.	The following suggest a diagnosis of acute bacterial rhinosinusitis instead of a common cold:		
	A) More severe symptoms than usual.	☐	☐
	B) Cold symptoms lasting more than 10 days.	☐	☐
	C) Low grade fever.	☐	☐
	D) Symptoms worsen after several days of improvement.	☐	☐
2.	Which of the following statements is FALSE on paediatric rhinosinusis?		
	A) Eye swelling from orbital infection can occur without pain in the eye or history of rhinosinusitis.	☐	☐
	B) Plain X ray is sensitive in the diagnosis of acute rhinosinusitis.	☐	☐
	C) Recalcitrant cases of rhinosinusitis require an exclusion of laryngopharyngeal reflux.	☐	☐
	D) Frequent exacerbations of chronic rhinosinusitis may benefit from 2 weeks of oral antibiotics.	☐	☐
3.	In patients with persistent allergic rhinitis		
	A) the most common aeroallergen locally is house dust mites.	☐	☐
	B) evaluation for asthma should be performed.	☐	☐
	C) measurement of total IgE is useful in the diagnosis.	☐	☐
	D) long-term use of oral glucocorticosteroids is not recommended due to safety concerns.	☐	☐

		True	False
4.	With regards to antibiotics and acute rhinosinusitis;		
	A) In general, adults suffer 6 to 8 colds per year.	☐	☐
	B) Antibiotics need not be started in patients with acute rhinosinusitis until after 10 days from onset of symptoms unless symptoms are severe.	☐	☐
	C) Greenish nasal discharge suggestive of bacterial sinusitis always requires antibiotic treatment.	☐	☐
	D) The recommended duration of use of antibiotics is 14 days.	☐	☐
5.	In the diagnosis of acute infective rhinosinusitis in adults,		
	A) fever is a diagnostic criteria.	☐	☐
	B) radiological imaging is not needed to make the diagnosis.	☐	☐
	C) eye swelling requires immediate specialist referral.	☐	☐
	D) symptoms should resolve within 5 days.	☐	☐
6.	For treatment of acute bacterial rhinosinusitis,		
	A) anti-histamines are indicated in all patients.	☐	☐
	B) fluoroquinolones should not be used as first line antibiotics.	☐	☐
	C) nasal corticosteroid spray has not been shown to reduce symptoms.	☐	☐
	D) oral steroids should be used for all patients.	☐	☐
7.	Drugs recommended for use in rhinitis in pregnancy include:		
	A) Budesonide	☐	☐
	B) Oral decongestants	☐	☐
	C) Leukotriene Modifiers	☐	☐
	D) Cefuroxime	☐	☐
8.	Recommended treatment for chronic sinusitis with nasal polyps in adults include		
	A) Antibiotics	☐	☐
	B) Nasal corticosteroid therapy	☐	☐
	C) Oral Steroids	☐	☐
	D) Mucolytics	☐	☐

		True	False
9.	Which of the following symptoms together with persistent nasal congestion or discoloured nasal discharge lasting for more than 3 months suggest the diagnosis of chronic sinusitis in adults?		
	A) Visual changes	☐	☐
	B) Epistaxis	☐	☐
	C) Loss of smell	☐	☐
	D) Headache	☐	☐
10.	Regarding paediatric allergic rhinitis:		
	A) In pre-school children, allergic rhinitis occurs at the same time as asthma	☐	☐
	B) Allergic rhinitis often come to light when preschoolers are being treated for co-mobidities, e.g. chronic otitis media with effusion	☐	☐
	C) The aim of treatment in paediatric allergic rhinitis is to cure the disease.	☐	☐
	D) All intranasal steroid sprays are safe for use in children.	☐	☐

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ISBN 978-981-08-5211-5