

RESPIRATORY SYSTEM...

*Cough, Common cold, Sore throat,
and Rhinitis*

Course Name: over-the-counter drugs

Course Code: 0521416

Lecturer: Ms. Asma El-Shara'. MPH

Faculty Of Pharmacy,

Philadelphia University-Jordan



جامعة فيلادلفيا
Philadelphia University



COUGH

COUGH - Introduction

- Cough is an important defensive respiratory reflex for airway protection.
 - As a clinical problem, however, cough has potentially significant adverse physical and psychological consequences, as well as substantial economic impact.
 - Cough is the **most common** symptom for which patients seek **outpatient medical care**. It also is a common reason for **emergency department** visits.
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The main **function** of coughing is airway clearance.

→ Excess secretions and foreign bodies are cleared from the lungs by a combination of coughing and the mucociliary escalator

Pathophysiology of Cough- ETIOLOGY

- Cough is initiated by **stimulation** of chemically and mechanically sensitive, **vagally** mediated bronchopulmonary and extrapulmonary sensory nerves in the pharynx, larynx, esophagus, and tracheobronchial airway epithelium
- **Voluntary** cough is controlled by the cerebral cortex.
- **In viral infections**, cough is mediated by a different, though not well understood, mechanism.
- The term **cough hypersensitivity syndrome** describes the proposed neural dysregulation resulting in cough associated with some chronic medical conditions.

Pathophysiology of Cough- PATHOGENESIS

- A cough starts with a **deep inspiration**,
- followed by **closure of the glottis** and **forceful contraction** of the chest wall, abdominal wall, and diaphragmatic muscles against the closed glottis; pressure within the thoracic cavity may reach 300 mm Hg.
- With **reopening of the glottis**, air is expelled with a velocity of approximately 11–15 m/second, **propelling** mucus, cellular debris, and foreign material out of the respiratory system

COUGH CLASSIFICATION

BASED ON ETIOLOGY

- Respiratory causes
- Nonrespiratory causes

BASED ON EXPECTORATION

- Productive
- Dry cough

BASED ON DURATION

- **Acute** (duration of less than 3 weeks),
- **Subacute** (duration of 3–8 weeks),
- **Chronic** (duration of more than 8 weeks),

Clinical Presentation of Cough

A PRODUCTIVE COUGH (a wet or “chesty” cough)

- Serves a useful physiologic purpose: **evacuation** of secretions from the lower respiratory tract that, if retained, could impair ventilation and the lungs’ ability to resist infection.
- Productive coughs **may be effective**, with **easily** expelled secretions, or **ineffective** to a variable degree, with secretions that are **difficult** to expel.

The appearance of the expectorated secretions is **not** always a reliable diagnostic indicator, but this material typically is **clear** with bronchitis and **purulent** with bacterial infection. Anaerobic bacterial infections are associated with a distinct putrid **malodor**.

NONPRODUCTIVE COUGH (dry or “hacking” cough),

- Which may be **associated with** viral and atypical bacterial infections, gastroesophageal reflux disease (GERD), cardiac disease, and some medications, serves **no** *useful physiologic purpose*.

Table 12-1 Common Causes of Cough

Classification	Etiologic Contributors
Acute	Viral URTI (common cold), acute bacterial sinusitis, acute bronchitis, pertussis, allergic rhinitis, COPD exacerbations, pneumonia, environmental irritants
Subacute	Postinfectious (e.g., <i>Mycoplasma pneumoniae</i> , <i>Bordetella pertussis</i>), congestive heart failure with fluid overload
Chronic	UACS, asthma or asthma-like conditions, GERD, COPD, chronic bronchitis

Key:

COPD = Chronic obstructive pulmonary disease;

GERD = gastroesophageal reflux disease;

UACS = upper airway cough syndrome;

URTI = upper respiratory tract infection.

Algorithm: Cough

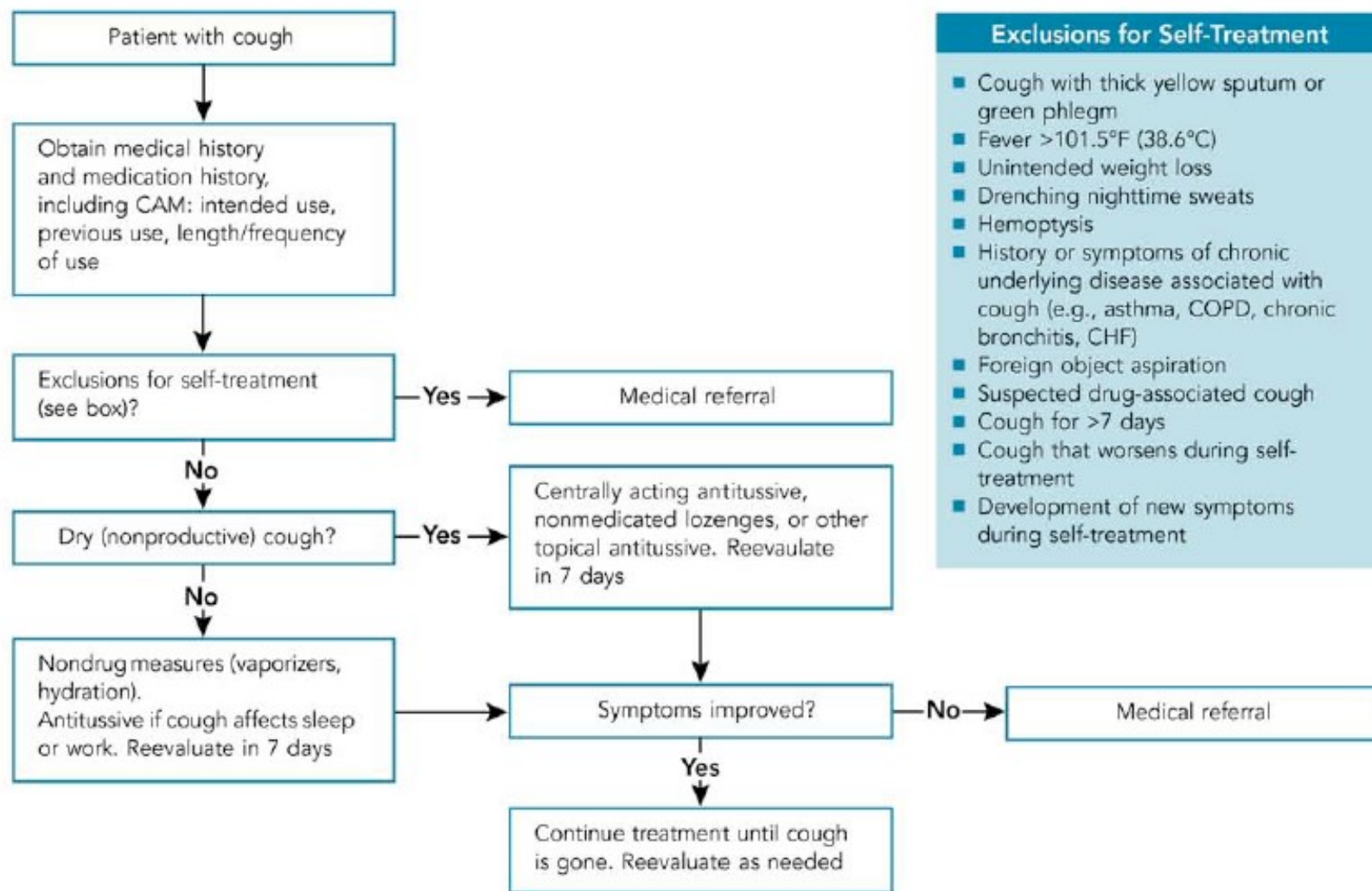


FIGURE 12-1 Self-care of cough. Key: CAM, complementary and alternative medicine; CHF, congestive heart failure; COPD, chronic obstructive pulmonary disease. (Adapted from reference 13.)

SPUTUM CHARACTERISTICS

- Normal quantity: 10–15 mL/24 hour
- Bronchorrhea: more than 100 mL/day

Quality

- Serous (Watery)
- Mucoid (Thick white)
- Purulent
- Green Coloured
- Rusty
- Red Currant Jelly Black
- Anchovy Sauce (Chocolate Brown)
- Granules—yellow/black
- Pink Frothy
- Black (melanoptysis)
- Foul Smelling

Treatment for cough- Treatment Goals

- 1- The primary goal of self-treatment for cough is to reduce the number and severity of coughing episodes.
- 2- The secondary goal is to prevent complications.

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- **Treatment is symptomatic.** Recognition of the underlying disorder or condition—the basis for the cough—is required for effective and definitive management.
 - The U.S. Food and Drug Administration (FDA) permits various combinations of antitussives, protussives, analgesics, decongestants, and antihistamines.

MEDICATIONS FOR COUGH- OTC Approach

1- Non-Pharmacological

- **Nonmedicated lozenges and hard candies** → stimulating production of saliva
- **Humidification** → increase the amount of moisture in inspired air, which may soothe irritated airways
- **Interventions to promote nasal drainage** → drops, rubber bulb nasal syringe → for infants and children less than 2-years of age
- **Hydration** → formation of less viscous secretions that are easier to expel.

MEDICATIONS FOR COUGH- OTC Approach

2- Complementary Therapy

➤ Honey

- ➔ A common but unproven home remedy, should not be given to children younger than 1 year because of the risk of botulism from ingestion of honey contaminated with *Clostridium botulinum*.

➤ Herbal therapies

- ➔ Available evidence does not support the use of complementary therapies for treating cough, and for some products, potential safety issues have been recognized

MEDICATIONS FOR COUGH- OTC Approach

3- Mucoactive Agents Expectorants, Mucoregulators And Microkinetics.

➤ **Protussives** (expectorants)

Change the consistency of mucus and increase the volume of expectorated sputum and may provide some relief for patients in whom coughing expels thick, tenacious secretions from the lungs with difficulty.

➤ **Mucolytics**

Break apart the molecules that make up mucus, making it thinner and easier to clear out of your lungs.

MEDICATIONS FOR COUGH- OTC Approach

4- Antitussives

- Antitussives (cough suppressants) control or eliminate cough and are the drugs of choice for treatment of nonproductive cough.
- Antitussives **should not be used** to treat productive cough unless the potential benefit outweighs the risk (as with significant nocturnal cough). Suppression of productive coughs may lead to retention of lower respiratory tract secretions, increasing the risk of airway obstruction and secondary bacterial infection.

MEDICATIONS FOR COUGH- ACTIVE INGREDIENTS

- PHARYNGEAL DEMULCENT: Lozenges, cough drops, linctuses containing syrup, glycerin, liquorices
- EXPECTORANTS (MUCOKINETICS): (a) Bronchial secretion enhancers: Sodium or Potassium citrate, Potassium iodide, Guaiphenesin (Glyceryl guaiacolate), balsum of Tolu, Vasaka, Ammonium chloride.
- (b) Mucolytics: Bromhexine, Ambroxol, Acetylcysteine, Carbocisteine
- ANTITUSSIVES (COUGH CENTRE SUPPRESSANTS): (a) Opioids: Codeine, Ethylmorphine, Pholcodeine. (b) Nonopioids: Noscapine, Dextromethorphan, Chlophedianol. (c) Antihistamines: Chlorpheniramine, Diphenhydramine, Promethazine. (d) Peripherally acting: Prenoxdiazine. (e) Adjuvant antitussives: Bronchodilators: Salbutamol,



Table 1.3
Practical prescribing: Summary of cough medicines

Name of medicine	Use in children	Likely side effects	Drug interactions of note	Patients in which care exercised	Pregnancy & breastfeeding
<i>Cough expectorants</i>					
Guaifenesin	>6 years	None	None	None	OK
<i>Cough suppressants</i>					
Codeine	>18 years	Sedation, constipation	Increased sedation with alcohol, opioid analgesics, anxiolytics, hypnotics and antidepressants	Asthmatics	Pregnancy – best avoided in 3rd trimester Short periods OK in breastfeeding. Reports of dextromethorphan causing drowsiness and poor feeding in the baby
Pholcodine	>6 years	Possible sedation			
Dextromethorphan	>6 years				

Antihistamines

Diphenhydramine*	>6 years	Dry mouth, sedation and constipation	Increased sedation with alcohol, opioid analgesics, anxiolytics, hypnotics and antidepressants	Glaucoma, prostate enlargement	Pregnancy – Standard references state OK, although some manufacturers advise avoidance Breastfeeding – OK as amount secreted into breast milk small. It may however reduce milk supply. Reports of poor feeding in the baby
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Demulcents

Simple linctus	>1 month	None	None	None	OK
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COMMON COLD,
SORE THROAT,
AND
RHINITIS

INTRODUCTION

- **Cold, also known as the common cold, is a viral infection of the upper respiratory tract**
- **The condition has no specific cure and is self-limiting with two-thirds of sufferers recovering within a week**
- **Children contract colds more frequently than adults with on average five to six colds per year compared to two to four colds in adults, although in children this can be as high as 12 colds per year.**

Pathophysiology of Colds

- ✓ A cold develops after a rhinovirus, **accounting for 30-50% of all cases** (or similar virus: **Coronaviruses, Parainfluenza virus, Respiratory syncytial virus, Adenovirus**) binds to intercellular adhesion molecule-1 receptors on respiratory epithelial cells in the nose and nasopharynx.
- ✓ Once inside the epithelial cells, the virus replicates, and infection spreads to other cells.
- ✓ Peak viral concentrations are achieved 2–4 days after initial inoculation, (**The most efficient mode of viral transmission is self-inoculation of the nasal mucosa or conjunctiva after contact with virus-laden secretions,**) and viruses are present in the nasopharynx for 16–18 days.
- ✓ Viral infection ends once enough **neutralizing antibody** leaks into the mucosa to end viral replication.

Differentiating Characteristics of Colds and Other Respiratory Disorders

Illness	Signs and Symptoms
Allergic rhinitis	Watery eyes; itchy nose, eyes, or throat; repetitive sneezing; nasal congestion; watery rhinorrhea; red, irritated eyes with conjunctival injection
Asthma	Cough, dyspnea, wheezing
Bacterial throat infection	Sore throat (moderate–severe pain), fever, exudate, tender anterior cervical adenopathy
Colds	Sore throat (mild–moderate pain), nasal congestion, rhinorrhea, sneezing common; low-grade fever, chills, headache, malaise, myalgia, and cough possible

Differentiating Characteristics of Colds and Other Respiratory Disorders- continued (1)

Illness	Signs and Symptoms
Croup	Fever, rhinitis, and pharyngitis initially, progressing to cough (may be “barking” cough), stridor, and dyspnea → Laryngotracheobronchitis → parainfluenza virus
Influenza	Myalgia, arthralgia , fever with oral T $\geq 100.4^{\circ}\text{F}$ – 102°F (38°C – 38.9°C), sore throat, nonproductive cough , moderate–severe fatigue
Otitis media	Ear popping, ear fullness, otalgia, otorrhea, hearing loss, dizziness
Pneumonia or bronchitis	Chest tightness, wheezing, dyspnea, productive cough, changes in sputum color, persistent fever

Differentiating Characteristics of Colds and Other Respiratory Disorders- continued (2)

Illness	Signs and Symptoms
Sinusitis	Tenderness over the sinuses, facial pain aggravated by Valsalva maneuver or postural changes, fever with oral T >101.5°F (38.6°C), tooth pain, halitosis, upper respiratory tract symptoms for >7 days with poor response to decongestants
West Nile virus infection	Fever, headache, fatigue, rash, swollen lymph glands, and eye pain initially, possibly progressing to <u>gastrointestinal distress</u> , central nervous system changes, <u>seizures</u> , or <u>Paralysis</u>
Whooping Cough (PERTUSSIS)	Initial catarrhal phase (rhinorrhea, mild cough, sneezing) of 1–2 weeks, followed by 1–6 weeks of paroxysmal coughing



Table 1.6
Practical prescribing: Summary of cold medicines

Name of medicine	Use in children	Likely side effects	Drug interactions of note	Patients in which care exercised	Pregnancy & breastfeeding
Antihistamines					
Diphenhydramine	>6 years	Dry mouth, sedation and constipation	Increased sedation with alcohol, opioid analgesics, anxiolytics, hypnotics and antidepressants	Glaucoma, prostate enlargement	Pregnancy – Standard references state OK, although some manufacturers advise avoidance Breastfeeding – OK as amount secreted into breast milk small. It may however reduce milk supply
Systemic sympathomimetics					
Phenylephrine	>12 years	At OTC doses insomnia most likely. Possibly may cause tachycardia	Avoid concomitant use with MAOIs and moclobemide due to risk of hypertensive crisis. Avoid in patients taking Beta-blockers and TCAs	Control of hypertension and diabetes may be affected, but a short treatment course is unlikely to be clinically important	Best avoided in pregnancy as mild fetal malformations have been reported Breastfeeding – OK as amount secreted into breast milk small. It may, however, reduce milk supply
Pseudoephedrine	>6 years				

Topical sympathomimetics

Oxymetazoline	>12 years	Possible local irritation in ~5% of patients	Avoid concomitant use with MAOIs and moclobemide due to risk of hypertensive crisis	None	Pregnancy Not adequately studied, avoid Breastfeeding – OK
Xylometazoline (Otrivine Child Nasal Drops)	>6 years				

MAOI, monoamine oxidase inhibitor; OTC over-the-counter; TCA, tricyclic antidepressant.

Sore throat

- Any part of the respiratory mucosa of the throat can give rise to symptoms of throat pain.
- This includes the pharynx (pharyngitis) and tonsils (tonsillitis),
- Pain can range from scratchiness to severe pain.
- Sore throats are often associated with the common cold.
- Viral infection accounts for between 70 and 90 % of all sore throat cases.
- Remaining cases are nearly all bacterial;
- The most common cause being Group A beta-haemolytic Streptococcus (also known as Streptococcus pyogenes).

Table 1.9
Features of viral and bacterial sore throat

	Age	Tonsillar/pharyngeal exudate	Duration	Cervical glands	Cough present	Other symptoms
Viral Infection	Any age	Possible but generally limited	3–7 days	Normal	Common	Low grade fever, headache
Bacterial Infection	School children	Often present and can be substantial	3–7 days	Swollen	Rare	High grade fever, possible rash



Table 1.11

Practical prescribing: Summary of sore throat medicines

Name of medicine	Use in children	Likely side effects	Drug interactions of note	Patients in which care exercised	Pregnancy & breastfeeding
<i>Local anaesthetics</i>					
Lidocaine	>12 years	Can cause sensitisation reactions	None	None	OK
Benzocaine	Lozenge >3 years Spray >6 years				
<i>Anti-inflammatories</i>					
Benzydamine	Rinse >12 years Spray >6 years	Oral rinse may cause stinging	None	None	OK, but in pregnancy limit use after 30 wks
Flurbiprofen	>12 years	None reported	None	Avoid in patients with peptic ulcers	Avoid if possible

Betadine gargle and mouthwash !!

ALLERGIC RHINITIS

- Allergic rhinitis, a systemic disease with prominent nasal symptoms, is a Worldwide problem that affects both adults and children
- Inflammation of the nasal lining. Characterized by rhinorrhoea, nasal congestion, sneezing and itching.
- The majority of cases will be viral infection, colds or *allergic rhinitis (AR)*.

Clinical Presentation of Allergic Rhinitis- Intermittent

Duration	Severity
Intermittent	Mild
Symptoms occur ≤4 days per week or ≤4 weeks.	Symptoms do not impair sleep or daily activities; no troublesome symptoms.
	Moderate–Severe
	<i>One or more of the following occurs:</i> impairment of sleep; impairment of daily activities; troublesome symptoms.
Daily activities include work, school, sports, and leisure.	

Clinical Presentation of Allergic Rhinitis- Persistent

Duration	Severity
Persistent	Mild
Symptoms occur <4 days per week and <4 weeks.	Symptoms do not impair sleep or daily activities; no troublesome symptoms.
	Moderate–Severe
	<i>One or more of the following occurs:</i> impairment of sleep; impairment of daily activities; troublesome symptoms.
Daily activities include work, school, sports, and leisure.	

Clinical Presentation of Allergic Rhinitis- Episodic

Duration	Severity
Episodic	
Symptoms occur on exposure to or contact with potential allergen that is not normally a part of the person's environment (e.g., a cat at a friend's house)	Can be mild, moderate, or severe —based on symptoms

Differentiation of Allergic Rhinitis From Nonallergic Rhinitis

Symptoms/Findings	Allergic Rhinitis	Nonallergic Rhinitis ^a
Symptom presentation	Bilateral symptoms that are worst upon awakening, subside during the day, then may worsen at night	Unilateral symptoms common but can be bilateral; constant day and night
Sneezing	Frequent, paroxysmal	Little or none
Rhinorrhea	Anterior, watery	Posterior, watery or thick and/or mucopurulent (associated with an infection)
Pruritus (itching) of eyes, nose, and/or palate	Frequent	Not present

Differentiation of Allergic Rhinitis From Nonallergic Rhinitis- CONTINUED -1

Symptoms/Findings	Allergic Rhinitis	Nonallergic Rhinitis^a
Nasal obstruction	Variable	Usually present and often severe
Conjunctivitis (red, irritated eyes with prominent conjunctival blood vessels)	Frequent	Not present
Pain	Sinus pain due to congestion may be present; throat pain due to postnasal drip irritation may be present.	Variable depending on cause
Anosmia	Rare	Frequent
Epistaxis	Rare	Recurrent

Differentiation of Allergic Rhinitis From Nonallergic Rhinitis- CONTINUED-2

Symptoms/Findings	Allergic Rhinitis	Nonallergic Rhinitis ^a
Facial, nasal, or throat features	“Allergic shiners” (periorbital darkening secondary to venous congestion)	Nasal polyps Nasal septal deviation Enlarged tonsils and/or adenoids
	“Dennie’s lines” (wrinkles beneath the lower eyelids)	
	“Allergic crease” (horizontal crease just above bulbar portion of the nose secondary to the “allergic salute”)	
	“Allergic salute” (upward “swipe” of tip of the nose with palm of the hand)	
	“Allergic gape” (open-mouth breathing secondary to nasal obstruction)	
	Nonexudative “cobblestone” appearance of posterior oropharynx	

Physical Exam

- Look test:
 - Allergic salute
 - Allergic shiners
 - Allergic crease
- Suggestive, but not specific
 - Rhinorrhea with clear mucous
 - Pale, boggy nasal mucosa/turbinates
 - Post-nasal drip
 - Bilateral rather than unilateral nasal obstruction

(Holmes & Scullion, 2012, Rafiq, 2013)



<http://healthyhappychildren.blogspot.com/2010/04/seasonal-allergies-allergic-salute.html>



<http://www.dr.bunn.com/archives/1228>



http://www.peds.ufl.edu/peds2/research/debusk/pages/page6_78.html

Causes of Nonallergic Rhinitis

Hormonal	Systemic Inflammatory
Pregnancy, puberty, thyroid disorders	Eosinophilic nonallergic rhinitis (NARES)
Structural	Lesions
Septal deviation, adenoid hypertrophy	Nasal polyps, neoplasms
Drug-Induced	Traumatic
Cocaine, beta blockers, ACEIs, chlorpromazine, clonidine, reserpine, hydralazine, oral contraceptives, aspirin or other NSAIDs, overuse of topical decongestants	Recent facial or head trauma
	Autonomic (Vasomotor)
	Age-related; physical or chemical agent causing parasympathetic hyperactivity

Key:

ACEIs = Angiotensin-converting enzyme inhibitors;

NARES = nonallergic rhinitis with eosinophilia syndrome;

NSAIDs = nonsteroidal anti-inflammatory drugs.

Table 1.15

Practical prescribing: Summary of rhinitis medicines

Name of medicine	Use in children	Likely side effects	Drug interactions of note	Patients in which care exercised	Pregnancy & breastfeeding
<i>Systemic antihistamines</i>					
Acrivastine	>12 years	Sedation, but rare and least likely with loratadine	None	None	Manufacturers advise avoidance, but safety data has shown them to be safe
Cetirizine	>2 years				
Loratadine	>2 years				
Chlorphenamine	>1 year	Dry mouth, sedation and constipation	Increased sedation with alcohol, opioid analgesics, anxiolytics, hypnotics and antidepressants	Glaucoma, prostate enlargement	Standard references state OK, although some manufacturers advise avoidance

Ocular antihistamines

Antazoline*	>12 years	Local irritation, bitter taste	Avoid concomitant use with MAOIs and moclobemide due to risk of hypertensive crisis	Avoid in glaucoma	Safety not established, but probably OK
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Nasal antihistamines

Azelastine	>5 years	Nasal irritation (5%), bitter taste (3%)	None	None	Safety not established, but probably OK
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Nasal corticosteroids

Beclometasone	>18 years	Nasal irritation, bitter taste, headache (fluticasone) nosebleeds	None	Avoid in glaucoma	Manufacturers advise avoidance, but safety data has shown them to be safe
Fluticasone					
Triamcinolone					

Summary to allergy medications

- ❖ Loratadine should be recommended as first-line therapy if the patient suffers from mild intermittent general symptoms such as nasal itching, sneezing, rhinorrhoea and associated ocular symptoms.
- ❖ If this fails to control all symptoms then sodium cromoglicate eye drops or a corticosteroid nasal spray should be added to the regimen.
- ❖ If a patient has moderate to severe intermittent symptoms, or persistent AR then regular topical nasal corticosteroids are recommended as first-line treatment