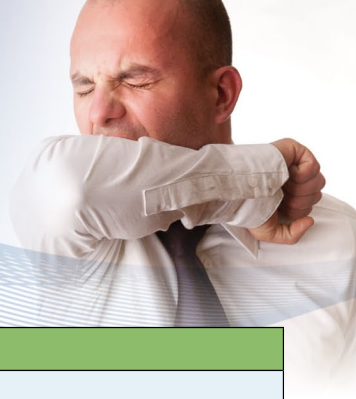
Cough

Etiology, evaluation and treatments

Update 2012



COUGH CHARACTERISTICS ACCORDING TO ETIOLOGY

Etiology	Characteristics
Cough caused by medication	- Generally, it is non-productive and usually resolves within 4 weeks of stopping medication. - Affects 5-20% of patients receiving an angiotensin converting enzyme inhibitor (ACEI). However, it has not been reported with ARBs (angiotensin receptor blockers). - Beta-blockers may be implicated in chronic cough, often by aggravating underlying asthma.
Upper airway cough syndrome (UACS)	- Rhinosinusitis and other upper airways disorders are the most common etiologies of chronic cough. - This syndrome used to be called postnasal drip syndrome. - The symptoms are often subtle (e.g. sensation of secretions in the back of the throat or impression of irritation of the upper airways). - Examination may reveal signs of pharyngitis. Sinus X-rays or CT scans may indicate signs of sinusitis. - The cough will diminish with nasal corticosteroids, a first- or latest-generation antihistamine or nasal anticholinergic, depending on the cause. - Nasal saline rinses may also be helpful.
Asthma	- Cough may be its only symptom. - In the presence of suggestive symptoms, diagnosis should be confirmed by the demonstration of variable airway obstruction. - The atopic history and ideally allergy skin tests should be documented. - The cough will respond to asthma treatment, usually inhaled corticosteroids.

Parameter	Degree of Change
FEV_1: forced expiratory volume in 1 second	▶ ≥12% and ≥200 ml improvement 15 min. after administration of a bronchodilator ▶ >20% after 10 to 14 days of treatment with inhaled or oral corticosteroids
PEF: peak expiratory flow measured with a flow meter such as the Mini-Wright	▶ ≥20% improvement postbronchodilator or after repeated tests
Methacholine challenge test: The PC_{20} methacholine is the concentration required to cause a 20% drop in FEV_1	▶ CP_{20} <8 mg/ml (Juniper method) ▶ The American Thoracic Society considers that there is a grey zone between 4 and 16 mg/ml.

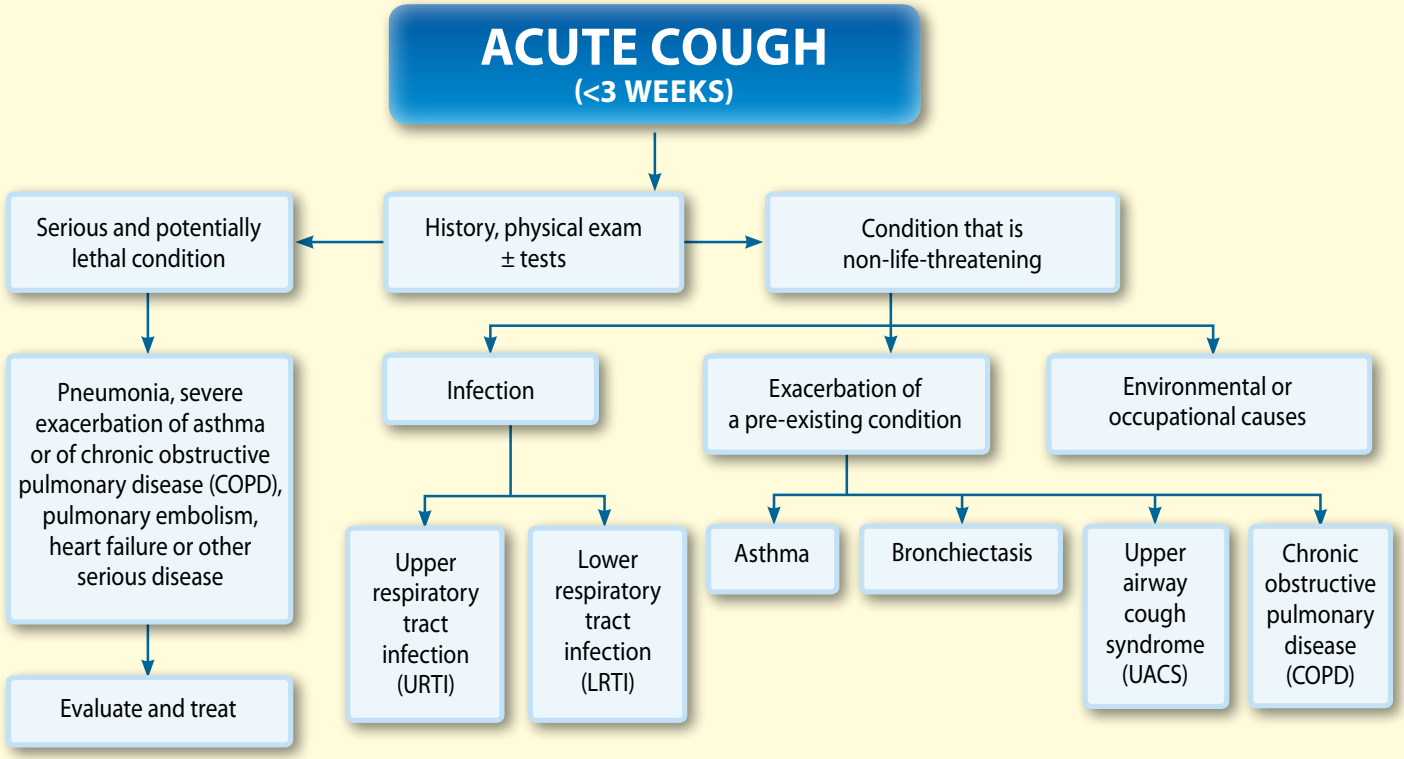
Gastroesophageal reflux disease (GERD)	- Reflux can be the cause of the cough or its consequence. It may or may not cause typical symptoms such as heartburn or regurgitation. - It is 1 of the 3 most common causes of chronic cough, and is responsible for approximately 25% of cases. - It is recommended that the first diagnostic test be an evaluation of the response to empiric reflux treatment, such as a proton pump inhibitor. Esophageal pH monitoring can sometimes be useful; however, the pH can be normal if the reflux is nonacidic (alkaline reflux).
Chronic bronchitis	- Cough secondary to tobacco dependence is often considered normal for smokers. In the absence of significant respiratory function abnormalities, it resolves 2 to 3 weeks after smoking cessation. - In long-term smokers, the possibility of cancer and COPD should be excluded. - Chronic bronchitis is defined as a cough with sputum expectoration for at least 3 consecutive months for at least 2 consecutive years.
Non-asthmatic eosinophilic bronchitis (NAEB)	A difficult diagnosis for the primary care physician to make. Patients present with bronchial eosiniphilia on sputum analysis, without bronchial hyperresponsiveness. The cough responds to inhaled corticosteroids, just as it does in asthma.
Post-infectious cough	- A respiratory infection is often the cause of this acute or subacute cough. It accounts for about 15% of chronic cough cases; thus other diagnoses must be excluded. - Generally the cough is non-productive and resolves in several weeks. Chest and sinus X-rays are usually normal.

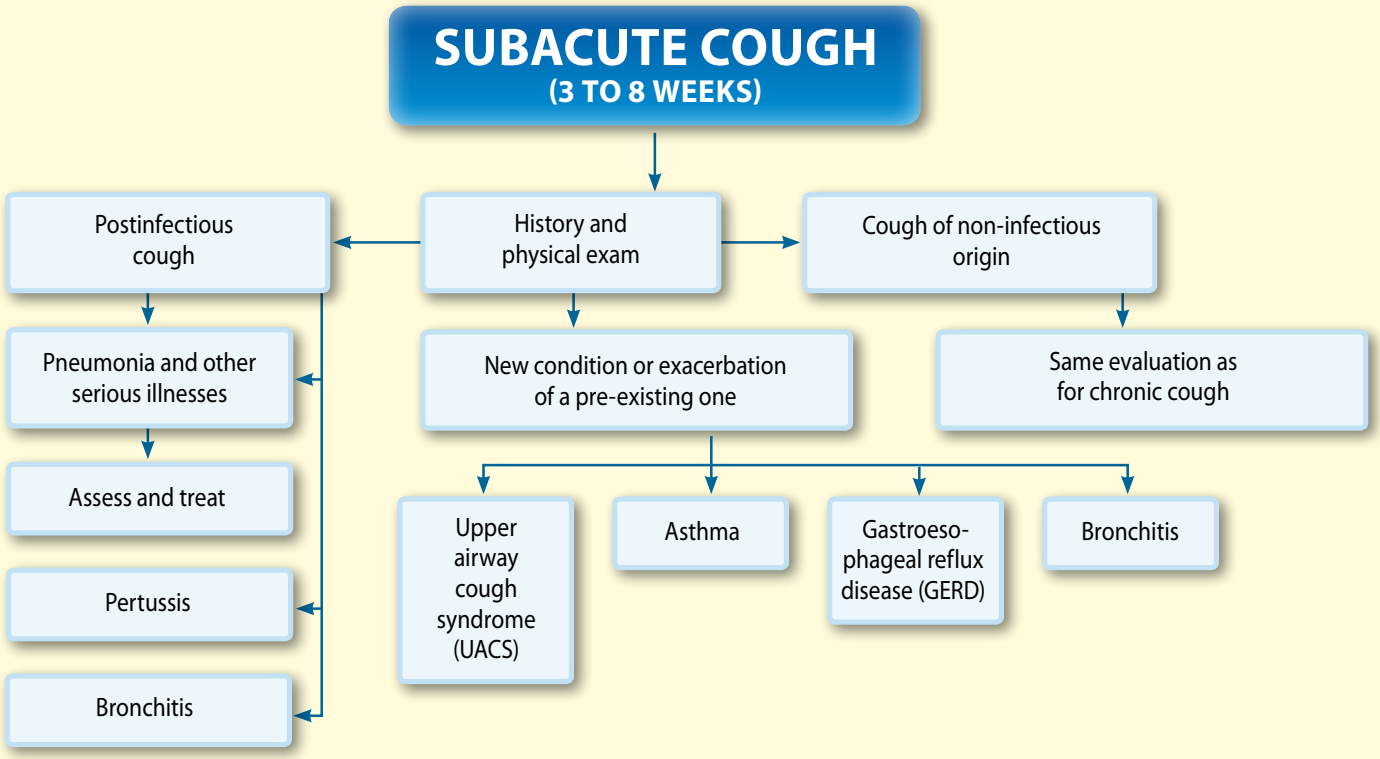
Less common causes

- Bronchiectasis is generally associated with persistent sputum production. It can be demonstrated with a CT scan performed without contrast.
- Investigations to rule out lung cancer must be undertaken in patients with a long smoking history, suggestive symptoms or physical signs (hemoptysis, general ill health, clubbing, etc.).
- Cystic fibrosis: increasingly common in adults, but diagnosis generally based on age, i.e. patients are generally younger.
- Zenker's diverticulum (esophageal pouch)
- Congestive heart failure
- Other lung diseases
- Psychogenic cough: diagnosis of exclusion without particular characteristics
- Unexplained cough (idiopathic) despite an extensive investigation

Cough is primarily a defense mechanism that allows bronchial secretions and inhaled particles to be eliminated.

Assessment Algorithms





In an arbitrary fashion, cough is classified as:

- Acute (less than 3 weeks in duration)
- Subacute (3 to 8 weeks)
- Chronic or persistent (>8 weeks)

CHRONIC COUGH
(>8 WEEKS)

History, physical exam and chest X-ray

Smoking, use of ACEIs → Discontinue → No response

Possible cause of cough identified → Investigate and treat → Inadequate response to optimal treatment

- **Upper airway cough syndrome (UACS)**: empiric treatment
- **Asthma**: evaluate if possible (spirometry, bronchodilator reversibility test, bronchial provocation test) or treat empirically
- **Non-asthmatic eosinophilic bronchitis (NAEB)**: look for esinophils in sputum; if not present, treat empirically
- **Gastroesophageal reflux disease (GERD)**: empiric treatment

Inadequate response to optimal treatment

COMPLEMENTARY INVESTIGATION OR REFERRAL TO SPECIALIST

OTHER EXAMINATIONS TO CONSIDER:

- 24-hour esophageal pH monitoring
- Endoscopic or videofluoroscopic evaluation of swallowing
- Esophageal transit study
- Sinus imaging
- High-resolution chest CT scan
- Bronchoscopy
- Echocardiogram
- Environmental evaluation
- Consider the possibility of other rare causes

Consider the possibility of several concomitant causes

Important general considerations:

- Optimize the treatment for each diagnosis
- Verify compliance with therapy
- Because of the possibility of more than 1 cause, continue all partially effective treatments

Adapted from Irwin RS, Baumann MH, Boulet L-P et al. Diagnosis and management of cough: Executive summary. ACCP evidence-based clinical practice guidelines. Chest 2006;129(Suppl 1):1S-23S.

PRINCIPAL TREATMENTS FOR COUGH, ACCORDING TO ETIOLOGY

Possible causes	Treatments
Acute or subacute cough (0-8 weeks)	
Upper respiratory tract infection (usually viral)	- First-generation antihistamines + oral decongestants - If subacute: among the therapeutic options, ipratropium and short-acting corticosteroids are both good choices
Acute sinusitis	First-generation antihistamines + oral decongestants + antibiotics as needed
Asthma exacerbation	- Introduce or increase inhaled corticosteroids, inhaled ß2-agonists - Oral corticosteroids if severe
COPD exacerbation	Bronchodilators, oral corticosteroids, antibiotics
Pertussis	Antibiotic (macrolide) – isolate for 5 days
Chronic cough (>8 weeks)	
Asthma	Environmental control and education, bronchial anti-inflammatories, bronchodilators, regular follow-up, action plan
Bronchiectasis	Bronchial toilet, bronchodilators*, treatment of secondary infections, surgery* if localized and infections are frequent
Chronic bronchitis	Smoking cessation, avoid respiratory irritants, bronchodilators, corticosteroids*
Non-asthmatic eosinophilic bronchitis	Inhaled corticosteroids
UACS	First-generation antihistamines + oral decongestants or nasal ipratropium
Allergic rhinitis	Topical nasal corticosteroids, latest-generation antihistamines
Non-allergic rhinitis	Inhaled nasal corticosteroids, nasal ipratropium
Chronic rhinosinusitis/Nasal polyposis	Inhaled nasal (oral*) corticosteroids, ENT assessment (surgery*)
Gastroesophageal reflux disease	Diet, refrain from eating or drinking 2 hours before bedtime. Avoid alcohol, caffeine, smoking, theophylline, calcium channel blockers, anticholinergics and NSAIDs. Elevate the head of the bed by 10 to 15 cm. Lose weight if obese. Possible medications: proton pump inhibitors, antacids, H2-receptor antagonists, sucralfate, prokinetic agents
Cough and pulmonary neoplasia	Treatment of the cause – smoking cessation – non-specific antitussives if too difficult
Cough caused by medication	Stop the medication that is responsible
Postinfectious cough	- May resolve on its own - First-generation antihistamines + oral decongestants, inhaled corticosteroids or nasal ipratropium may help
Psychogenic or habit cough	Psychotherapy, non-specific antitussive treatment for a short period*

* Indicates a therapeutic option that may be useful in certain patients
Note: Non-specific antitussives may sometimes be used for a very short period if the cough is very debilitating and disrupts sleep.

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References: Irwin RS, Baumann MH, Boulet L-P et al. Diagnosis and management of cough: Executive summary. ACCP evidence-based clinical practice guidelines. *Chest* 2006;129(Suppl 1):1S-23S.Boulet L-P. Tout sur la toux! *Le clinicien* 2008;23(4):77-82.

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