



**Cough Algorithm:**  
*Simplify Cough Management  
in India*



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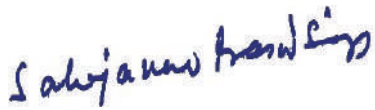
## Message From President and Hon. Secretary-General

We, at the Indian Medical Association (IMA), a national voluntary organization of doctors of modern scientific allopathy system of medicine, look after the interest of doctors as well as the well-being of the community at large.

Our objective is to promote and advance medical and allied sciences and their different branches. We aim to promote the improvement of public health and medical education in India. Hence, IMA has taken a step forward for developing recommendations based on a thorough literature review and robust evidence for assisting general practitioners to perform accurate diagnosis and stepwise management of cough in India. A group meeting was conducted among general practitioners, ENT specialists, pediatricians, consulting physicians, and chest physicians, where important issues related to the stepwise management of cough were discussed.

We feel immense pleasure in announcing that the final recommendation from the meeting has been derived and has been published and it is accessible to all.

We thank all the experts for their participation in developing these recommendations so that these can be utilized by general practitioners for the diagnosis and stepwise management of cough effectively in the Indian scenario.



**Dr. Sahjanand Prasad Singh**  
National President  
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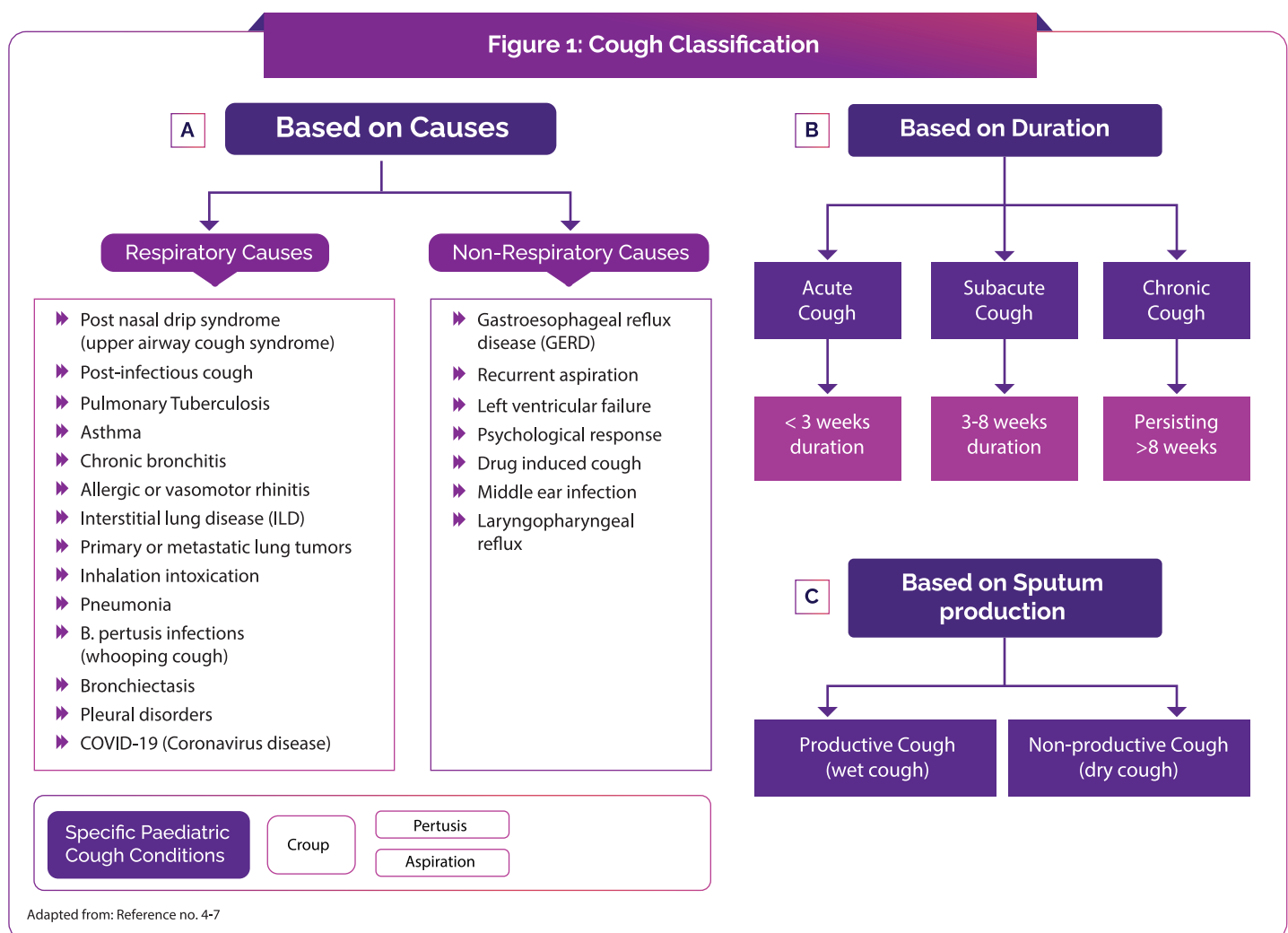
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# Cough Algorithm: *Simplify Cough Management in India*

## Introduction

A cough, also known as tussis, is a voluntary or involuntary act that clears the throat and breathing passage of foreign particles, microbes, irritants, fluids, and mucus; it is a rapid expulsion of air from the lungs<sup>1</sup>. Cough accounts for the second most common symptom reported in primary care practice in India after fever.<sup>2</sup> It is an essential protective mechanism for human respiratory system. According to a detailed Cough Feedback and Profiling survey conducted in 5115 Indians, majority of the patients present with acute cough, 57% have dry cough with no or minimal sputum, 24% patients have productive cough with thick or viscous mucus with difficulty, 16% have productive cough with no difficulty in expectoration and 3% have broncho-spastic cough.<sup>3</sup>

Cough can be classified based on causes, duration and sputum production Figure 1 (A,B,C).



A number of clinical conditions can have cough as one of the symptom. Table 1 shows the common causes of cough in adults and pediatric populations.

**Table 1: Common Causes of Adult and Pediatric Cough**

| CAUSE  | PRESENTATION   |
|--|--|
| Asthma   | Wheezing cough, exacerbated by allergies, exercise, and cold with diurnal variation, with symptoms being worse at night  |
| Bronchiectasis   | Cough with sputum (mucoïd and odorless), progressive dyspnea, intermittent wheezing, hemoptysis, bi-basal crackles and wheezes   |
| COVID  | Dry cough, anosmia, loss of taste ageusia, fever, unusual fatigue, and loss of appetite  |
| COPD   | Patient with chronic copious cough with dyspnea along with history of smoking  |
| Drug induced cough   | Drugs like ACEIs and ARBs and Calcium channel blocker  |
| GERD   | Chronic cough, at night and/or postprandial, leads to heartburn, regurgitation, loss of appetite, persistent vomiting and problem in swallowing  |
| Inhalational toxicity                                      | Cough due to exposure to a corrosive gas, vapor, or fumes due fire accidents   |
| Laryngopharyngeal reflux                                   | Silent reflux in which gastric acid travels up the esophagus and gets to the throat causing irritation in the larynx and hence makes the patient cough   |
| Lung cancer  | Sudden weight loss >10lb, musculoskeletal pain, headaches, syncope, lymphadenopathy >1cm, cough with voice hoarseness, bone tenderness   |
| Obstructive sleep apnea                                    | Patient's complaints of waking up to gasp for breath or choking, insomnia, night sweats, nighttime reflux, and excessive nighttime liquid intake   |
| Pneumonia  | Five key predictors for pneumonia are temperature >100° F, heart rate >100 beats per minute, crackles, decreased breath sounds, and absence of asthma.   |
| Post infectious cough                                      | Self-limiting and will usually resolve with time   |
| Psychogenic cough (somatic cough syndrome and habit cough) | Identified after exclusion of uncommon causes of cough, characterized by barking honking cough and is often reported to be absent at night   |
| Rare causes for cough: Laryngeal sensory neuropathy (LSN)  | Seen in goitrous patients can exhibit symptoms like persistent cough, throat clearing, dysphonia, or globuspharyngeus.   |
| Tuberculosis   | Chronic cough, hemoptysis, weight loss, low-grade fever, chills and night sweats, associated with poverty, malnutrition, HIV/AIDS, chronic immunosuppressive therapy, mining, construction workers, pneumoconiosis (silicosis) |
| Upper airway viral infection (Common cold)                 | Clinical diagnosis with symptoms like cough, sore throat, runny nose, nasal congestion, headache, low-grade fever, facial pressure sneezing, malaise, myalgias   |
| Vocal cord dysfunction                                     | Patients can show noisy breathing, dysphonia, stridor, tachypnea, hoarseness of voice, tugging of the neck or upper chest muscles  |
| PEDIATRIC COUGH  |  |
| Chronic cough due to bronchial asthma/allergy              | Cough, dyspnea, wheezing, bronchial hyper responsiveness, and reversible airflow limitation  |
| Chronic bacterial bronchitis                               | Cough for viral induced inflammation of tracheobronchial tree  |
| Foreign body aspiration                                    | Sudden choking followed by prolonged cough along with non responding pneumonia   |
| Non specific cough   | Cough of more than 4 weeks duration with no symptoms or signs suggestive of a likely underlying problem  |
| Pertusis   | Severe paroxysms of coughing followed by a gasping inspiration   |
| Psychogenic cough  | Barking honking cough and is often reported to be absent at night  |
| Viral- induced upper respiratory infections                | Blocked nose, and cough lasting for 3–4 weeks  |
| Vocal cord dysfunction                                     | Chronic cough, throat tightness, shortness of breath   |

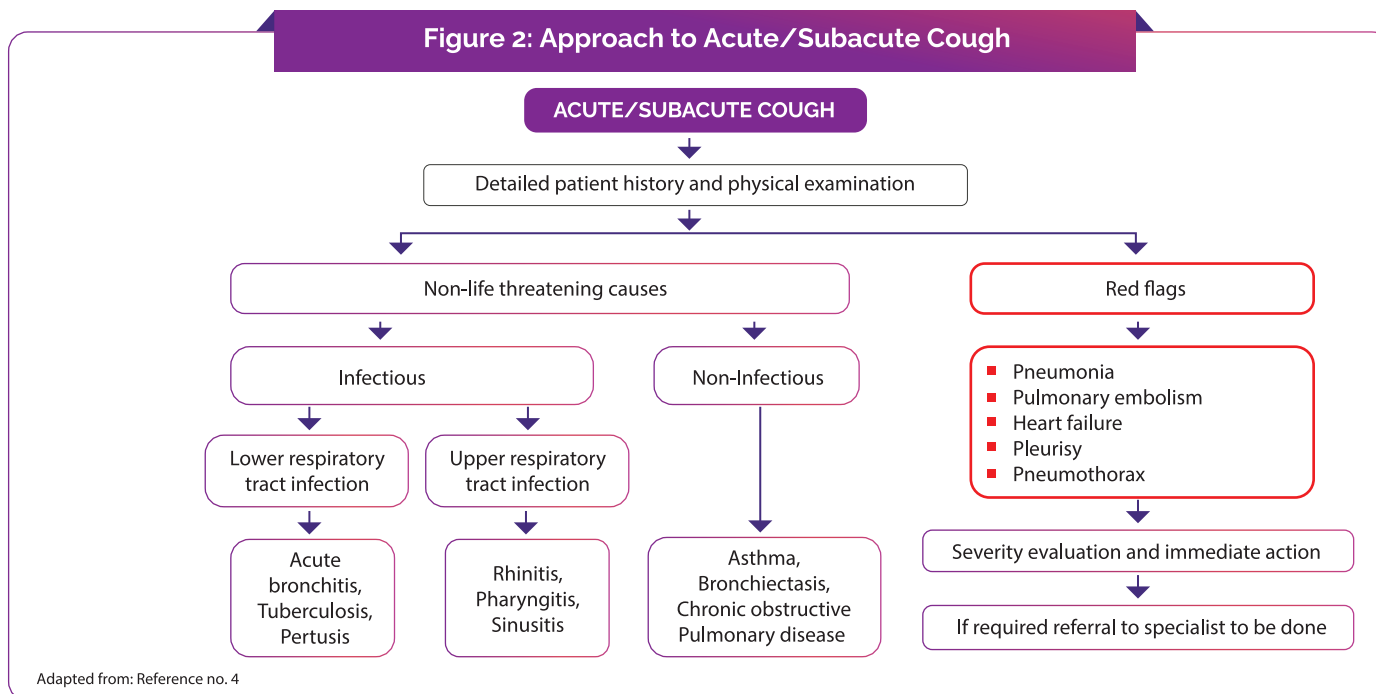
ACEIs: Angiotensin-converting enzyme inhibitors, ARBs: Angiotensin receptor blockers, COVID: Coronavirus disease, COPD: Chronic obstructive pulmonary disease, GERD: Gastroesophageal reflux disease, HIV/AIDS: Human immunodeficiency virus infection and acquired immune deficiency syndrome

Adapted from: Reference no. 8-17

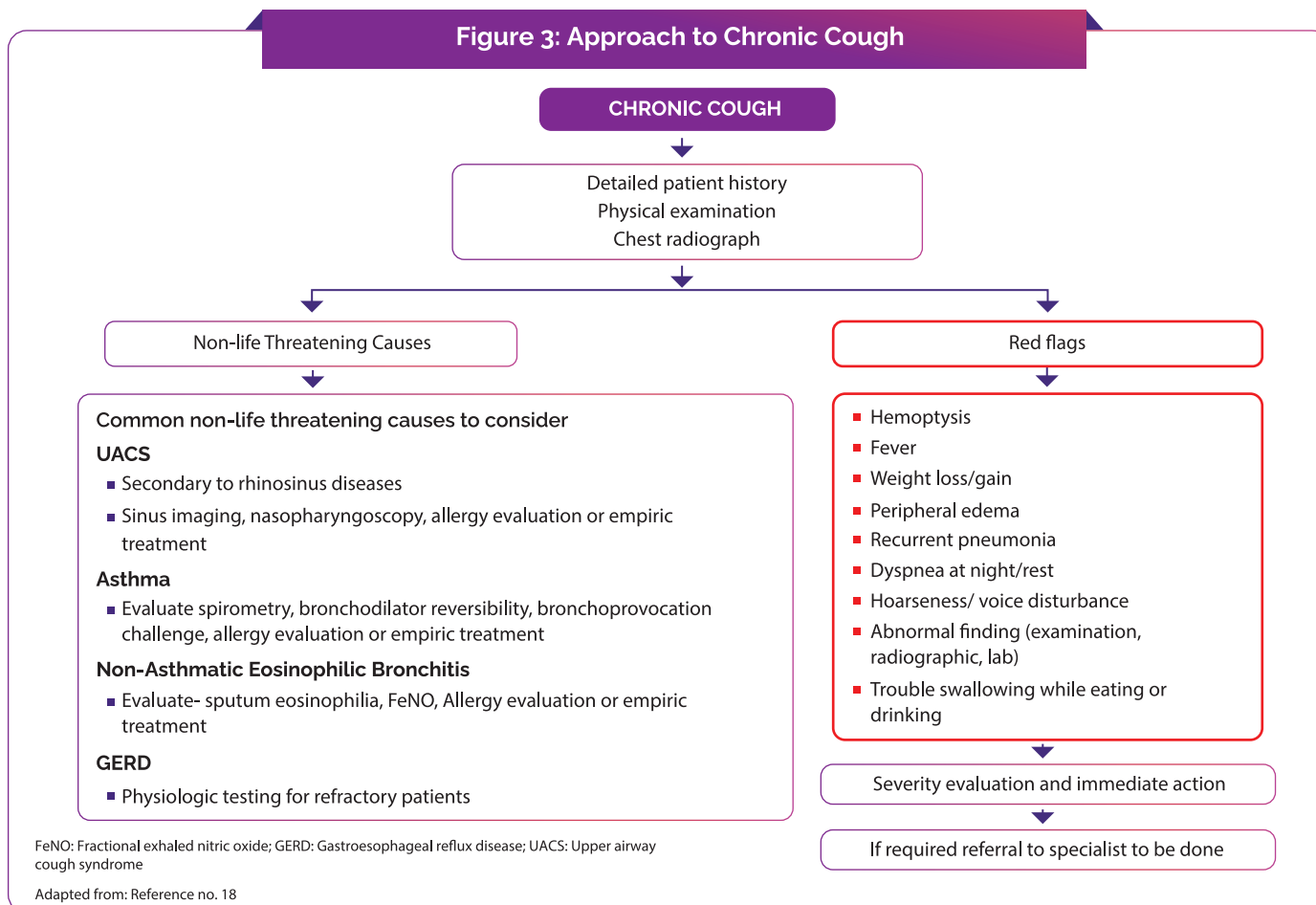
## General Approach to Cough

General approach is beneficial for determining the cause and guiding treatment of acute/ sub-acute (3-8 weeks) (Figure 2) and chronic cough (>8 weeks) (Figure 3) in adult patients.<sup>4,18</sup>

**Figure 2: Approach to Acute/Subacute Cough**



**Figure 3: Approach to Chronic Cough**





## Diagnosis of Cough

Subjective tools state an important insight into patients' personal experiences of cough, evaluating psychosocial elements of cough like the cough symptom score. Cough Symptom Score is a simple bi-component questionnaire referring to symptoms, seen in day and nighttime, scored from 0 to 5 (Table 2). It is based on the frequency, intensity, and influence of cough on day-to-day activities and sleep.<sup>19</sup>

**Table 2: Questionnaire of Cough Symptom Score**

| Score | Daytime cough symptom score  | Nighttime cough symptom score           |
|-------|--|---|
| 0     | No cough during the day  | No cough during the night               |
| 1     | Cough for one short period   | Cough on waking only                    |
| 2     | Cough for more than two short periods                                    | Wake once or early due to cough         |
| 3     | Frequent coughing, which did not interfere with usual daytime activities | Frequent waking due to coughs           |
| 4     | Frequent coughing, which did interfere with usual daytime activities     | Frequent coughs most of the night       |
| 5     | Distressing coughs most of the day                                       | Distressing coughs preventing any sleep |

Adapted from: Reference no. 19

Like many physical signs and symptoms, differentiating various types of cough sounds (Table 3) is important. Healthcare professionals can recognize some of the cough sounds that may provide useful clinical information for cough monitoring.

**Table 3: Cough Sound Analysis in Adults and Children**

| Different types of cough sounds in adults   |
|---|
| 1. <b>Brassy cough:</b> Intrathoracic tumors (especially aneurysm, or mediasternal tumor) can press on the trachea and produce cough with a metallic quality. Tracheal or bronchial involvement   |
| 2. <b>Bovine cough:</b> If a tumor involves, the recurrent laryngeal branch of vagus nerve and interface with the normal movement of vocal cords, the cough loses its explosive character and becomes prolonged and wheezing like that of a cough |
| 3. <b>Whooping cough:</b> A gasp of air between coughs (Whoop sound)  |
| 4. <b>Hysterical cough:</b> It is loud and barbering  |
| 5. <b>Barking (croupy) cough:</b> Pathology is in subglottic area. Makes noisy, high-pitched breathing sounds both when inhaling and exhaling   |
| 6. <b>Paroxysmal cough:</b> Bronchial asthma, Left ventricular failure, characterized by intermittent attacks of violent, uncontrollable coughing   |
| 7. <b>Persisting cough more in the morning with production for month/years:</b> Chronic bronchitis  |
| Pediatric cough characteristics   |
| 1. <b>Barking/brassy seal like:</b> When a cough forces air through this narrowed passageway, the swollen vocal cords produce a noise similar to a seal barking   |
| 2. <b>Whooping/Paroxysmal/Spasmodic:</b> Post-infectious (Pertusis); characterized by intermittent attacks of violent, uncontrollable coughing  |
| 3. <b>Staccato:</b> Post-infectious (Chlamydia), cough that comes as a series of outbursts with time for at least one breath in between each one  |
| 4. <b>Honking:</b> Tic and somatic syndrome, cough is a noisy bark or honking, repeated frequently while the child is awake, but absent during sleep  |

Adapted from: Reference no. 15

For successful management of underlying etiology of cough, an accurate diagnosis is important. Examination of sputum characteristics like sputum color, odour and consistency helps in diagnosis of underlying causes of cough (Table 4).<sup>20</sup> A careful medical history (Table 4) and precise diagnostic tests (Table 5 and 6) provides an important clue that leads to targeted treatment without the need for further investigation.<sup>21</sup>

**Table 4: Cough Diagnosis Based on History and Symptoms**

| Questions                      | Findings  | Suggestive of  |
|--------------------------------|---|--|
| <b>Medical History</b>         | Characteristics of sputum like color, consistency and odor                      |  |
|                                | Smoking history   |  |
|                                | Occupational or environmental exposure  |  |
|                                | Medication history: eg. angiotensin converting enzyme inhibitors or other drugs |  |
|                                | Timing of cough: eg. asthma in case of nocturnal cough                          |  |
|                                | Relieving factors   |  |
|                                | Aggravating factors   |  |
| <b>Family history</b>          | Tuberculosis exposure   |  |
| <b>Course of the cough</b>     | Constant, worsening, persistent, paroxysmal, diurnal variation                  |  |
| <b>Duration of cough</b>       | Less than 3 weeks- acute cough  | Pneumonia, acute bronchitis  |
|                                | More than 8 weeks- chronic cough  | Postnasal drip syndrome, GERD, smokers tuberculosis, bronchiectasis, lung abscess, interstitial lung disease, pertusis |
| <b>Nature of cough</b>         | Non-productive cough  | Postnasal drip, bronchitis, GERD, viral infections   |
|                                | Productive cough  | Asthma, secondary infection lung abscess, tuberculosis, malignancy, bronchiectasis, pulmonary edema                    |
| <b>Sputum odor</b>             | Foul-smelling expectoration   | Anaerobic infections due to aspiration, lung abscess and necrotizing pneumonia   |
| <b>Sputum color</b>            | Rusty   | <i>Pneumococcal</i> pneumonia, paragonimiasis  |
|                                | Currant-jelly or dark-red   | <i>Klebsiella pneumoniae</i>   |
|                                | Yellowish, green phlegm   | Viral bronchitis, acute respiratory infections, COPD exacerbation  |
|                                | Red sputum with bright red blood or blood clots                                 | Carcinoma of the lung, tuberculosis, pulmonary embolism  |
|                                | Blood-streaked, purulent sputum   | Bronchitis, bronchiectasis, or pneumonia   |
|                                | Blood-tinged, white, frothy sputum  | Congestive heart failure   |
|                                | Foul-smelling, bloody sputum  | Anaerobic lung abscess   |
|                                | "Anchovy paste" sputum  | Ruptured hepatic amebic liver abscess  |
|                                | White   | Allergies, asthma and often viral infections   |
|                                | Black pigmented, Charcoal or Gray   | Heavy smokers, factory workers and coal workers' pneumoconiosis (anthracosis)  |
| <b>Sputum consistency</b>      | Mucopurulent sputum   | Bacterial pneumonia or bronchitis  |
|                                | Scanty watery sputum  | Atypical pneumonia   |
|                                | Salty/sandy sputum  | Echinococcosis   |
| <b>Microscopic examination</b> | Larvae of Strongyloides   | Disseminated infection   |
|                                | Gram-positive diplococci  | Pneumococcal pneumonia   |
|                                | No presence of typical bacterial organisms                                      | Mycoplasma, viral and legionella pneumonia   |
| <b>Posture</b>                 | Lying down position   | Postnasal drip, GERD, pulmonary congestion   |
|                                | Contralateral   | Bronchogenic   |
| <b>Triggers</b>                | Pollens, allergens, organic dust-cotton, irritants-tobacco                      |  |

COPD: Chronic obstructive pulmonary disease; GERD: Gastro-oesophageal reflux disease

Adapted from: Reference no. 20

**Table 5: Laboratory and Other Diagnostic Tests**

| Laboratory tests   |   |           |                        |               |                         |                      |   |                         |  |
|--|---|-----------|------------------------|---------------|-------------------------|----------------------|---|-------------------------|--|
| <b>Complete blood count</b>  | Leukocytes  | High      | Pneumonia              |               |                         |                      |   |                         |  |
|  | Erythrocyte Sedimentation Rate  | High      | Tuberculosis           |               |                         |                      |   |                         |  |
|  | C-Reactive Protein  | High      |                        |               |                         |                      |   |                         |  |
|  | Leukocytes  | High      |                        |               |                         |                      |   |                         |  |
|  | Eosinophils   | High      | Allergic Cough, Asthma |               |                         |                      |   |                         |  |
|  | Leukocytes, Neutrophils   | Very high | COVID-19               |               |                         |                      |   |                         |  |
|  | Lymphocytes   | Low       |                        |               |                         |                      |   |                         |  |
|  | Lymphocytes   | Low       | Lung Cancer            |               |                         |                      |   |                         |  |
|  | Neutrophils   | High      |                        |               |                         |                      |   |                         |  |
| Leukocytes, Lymphocytes  | High  | Pertusis  |                        |               |                         |                      |   |                         |  |
| <b>Chest X-Ray/Radiograph</b>  | <ul style="list-style-type: none"> <li>▶ Routinely recommended for chronic cough</li> <li>▶ Diagnosis of different pulmonary disorders: Nodules (lung cancer), tuberculosis, pneumothorax, pneumonia, atelectasis, cardiomegaly, pneumothorax, consolidation, emphysema, fibrosis and COVID-19. If an obvious abnormality is observed on plain films, additional investigation is selected based on the characteristics of the lesion</li> </ul>  |           |                        |               |                         |                      |   |                         |  |
| <b>CT scan</b>   | Done to detect lesions anterior and posterior to the mediastinum; small pulmonary nodules; thickening and calcification of trachea; stenosis of the trachea; and enlargement of mediastinal lymph nodes, broncholithiasis, relapsing polychondritis, and bronchial foreign body. High-resolution CT is helpful for the early diagnosis of interstitial pulmonary diseases and atypical bronchiectasis   |           |                        |               |                         |                      |   |                         |  |
| <b>Sputum microscopy &amp; culture</b>   | <p><b>Clinical Indications</b></p> <p><b>Microbiology:</b></p> <ul style="list-style-type: none"> <li>▶ Productive cough With sputum</li> <li>▶ Infective exacerbations of any chronic lung disease</li> <li>▶ Pneumonia</li> </ul> <p><b>Tuberculosis (TB)</b></p> <ul style="list-style-type: none"> <li>▶ <b>True NAT:</b> Chip-based RT-PCR micro device for the detection of extrapulmonary TB</li> <li>▶ <b>CB NAAT:</b> Detects TB bacilli and screens for rifampicin drug resistance</li> <li>▶ <b>AFB culture:</b> Smear-positive sputum is usually an initial clue for diagnosis of pulmonary TB</li> </ul> <p><b>Cytology:</b></p> <ul style="list-style-type: none"> <li>▶ Suspected lung cancer</li> </ul> |           |                        |               |                         |                      |   |                         |  |
| <b>Diagnostic pleural aspiration</b>   | <p><b>Clinical Indications</b></p> <p>Pleural effusion either detected clinically or with imaging, e.g. Chest X-Ray, Ultrasound, CT scan</p> <table border="0"> <tr> <td>Straw colored</td> <td>Pleural fluid is normal</td> </tr> <tr> <td>Heavily bloodstained</td> <td>Can be malignancy, pulmonary infarction or trauma</td> </tr> <tr> <td>Creamy opalescent fluid</td> <td>Chylothorax (lymphoma, trauma to thoracic duct, yellow nail syndrome, lymphangioleiomyomatosis) or pseudochylothorax, e.g. in tuberculosis</td> </tr> </table>   |           |                        | Straw colored | Pleural fluid is normal | Heavily bloodstained | Can be malignancy, pulmonary infarction or trauma | Creamy opalescent fluid | Chylothorax (lymphoma, trauma to thoracic duct, yellow nail syndrome, lymphangioleiomyomatosis) or pseudochylothorax, e.g. in tuberculosis |
| Straw colored  | Pleural fluid is normal   |           |                        |               |                         |                      |   |                         |  |
| Heavily bloodstained   | Can be malignancy, pulmonary infarction or trauma   |           |                        |               |                         |                      |   |                         |  |
| Creamy opalescent fluid  | Chylothorax (lymphoma, trauma to thoracic duct, yellow nail syndrome, lymphangioleiomyomatosis) or pseudochylothorax, e.g. in tuberculosis  |           |                        |               |                         |                      |   |                         |  |
| <b>PET scan:</b>   | Especially for diagnosing lung cancer, using a special tracer that marks cancer cells   |           |                        |               |                         |                      |   |                         |  |
| Other Tests  |   |           |                        |               |                         |                      |   |                         |  |
| <b>Pulmonary function tests</b>  | Includes pulmonary ventilation tests, spirometry and the bronchial provocation test. Diagnose asthma, chronic obstructive pulmonary disease and other conditions that affect breathing  |           |                        |               |                         |                      |   |                         |  |
| <b>Cough provocation test</b>  | Positive findings on the cough provocation test are important in the diagnosis of Cough Variant Asthma (CVA). Average daily peak expiratory flow variation of >10% suggests CVA   |           |                        |               |                         |                      |   |                         |  |
| <b>CRP (C-reactive protein)</b>  | A low CRP test may be helpful in excluding antibiotic use or delayed prescribing of antibiotic.   |           |                        |               |                         |                      |   |                         |  |
| <b>PCT (Procalcitonin)</b>   | Can be used as a marker of bacterial infection  |           |                        |               |                         |                      |   |                         |  |
| <b>IgE (Imunoglobulin E)</b>   | It is an important diagnostic test for evaluation of cough associated with suspected allergy  |           |                        |               |                         |                      |   |                         |  |
| <b>NT-proBNP</b>   | In subjects with coronary disease, it acts as a diagnostic measure for ventricular dysfunction  |           |                        |               |                         |                      |   |                         |  |
| <b>NOTE-</b> Hospitals unable to perform the cough provocation test can monitor the average peak expiratory flow variation overtime. |   |           |                        |               |                         |                      |   |                         |  |

PET: Positron Emissiontomography; NT-proBNP: N-terminal pro-brain natriuretic peptide; CT: Chest computed tomography

Adapted from: Reference no. 21-25

**Table 6: Chronic Cough with Normal X-ray Chest**

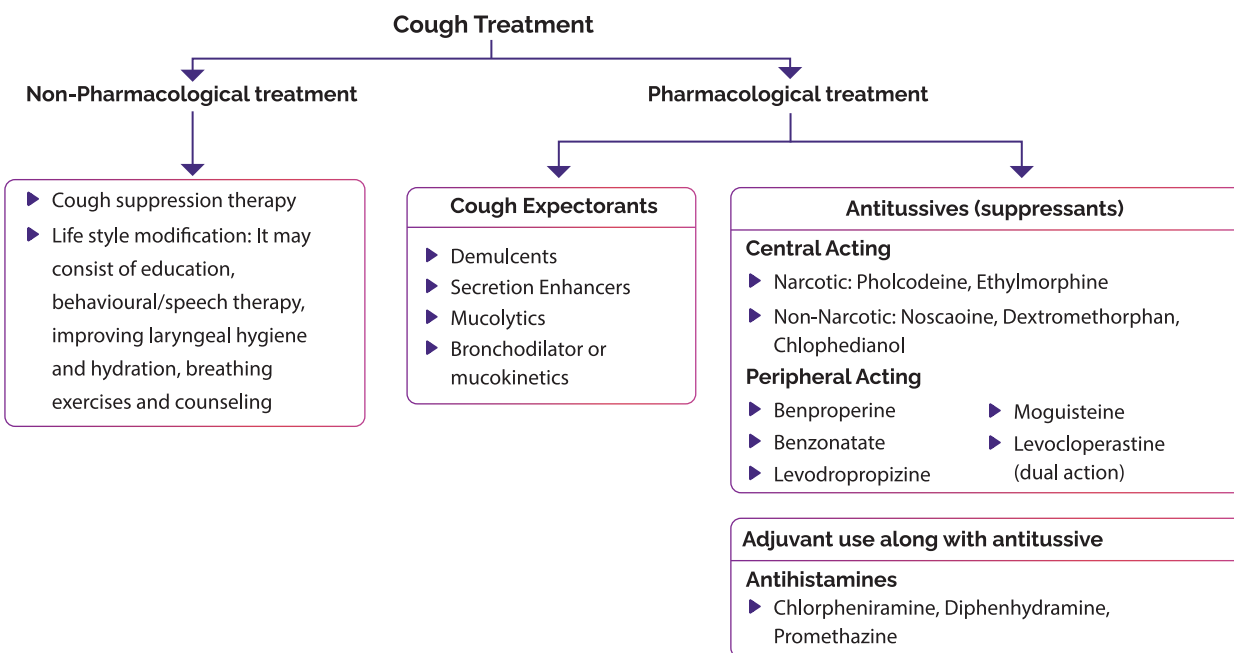
|                                  |
|----------------------------------|
| Airway disease                   |
| Upper Respiratory tract disorder |
| Early Congestive cardiac failure |
| Gastroesophageal reflux disease  |
| Psychogenic cough                |
| Micro-aspiration                 |
| ACE inhibitor induced cough      |
| Early Interstitial lung disease  |
| Chronic Intractable cough        |

Adapted from: Reference no. 26

### Classification of Cough Treatment

Cough can be treated pharmacologically and non-pharmacologically (Figure 4). There are a number of pharmacological treatment options currently available as monotherapy or combination therapy used for productive and non-productive cough. These include a broad array of drugs, including antitussives, antihistamines, decongestants, expectorants among others (Table 7).

**Figure 4: Cough Treatment**



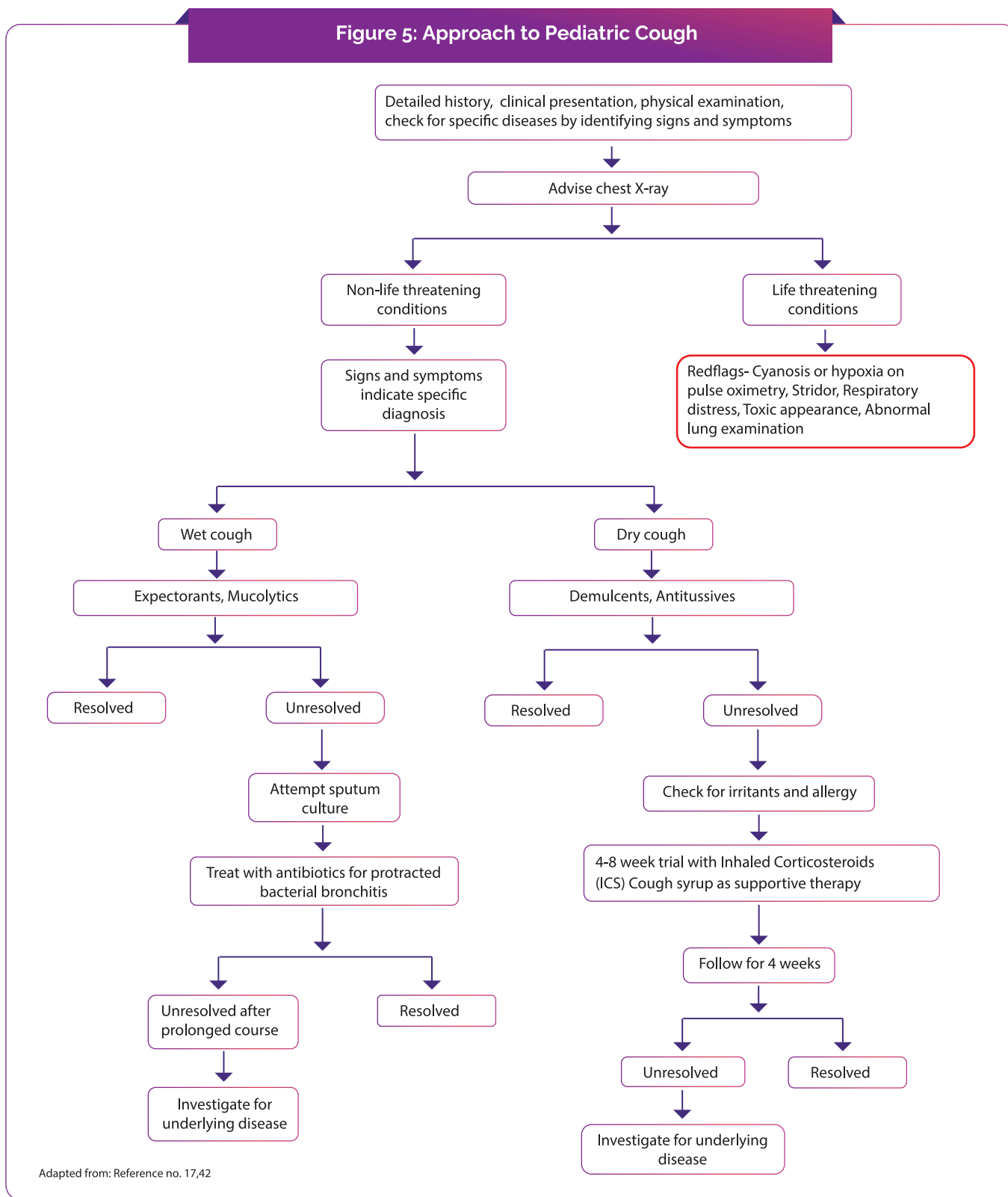
**NOTE-** Cough treatment must be directed towards underlying etiology. Cough must only be treated if it is bothersome, or is associated with cough complications or if it is required to stop spread of disease like COVID-19 and TB.

Adapted from: Reference no. 21, 27-41

## Approach to Pediatric Cough

Approach to pediatric cough (Figure 5) helps in determining the cause and guiding treatment in children.<sup>28</sup>

Figure 5: Approach to Pediatric Cough



**Table 7: Pharmacological Cough Treatment**

|   |  |
|---|--|
| <p><b>Demulcents:</b> Acacia, licorice, glycerin, honey, and wild cherry syrups</p> <p><b>Secretion enhancers:</b> Guaifenesin: Adults, elderly and children above 12 years: 200 mg up to QID</p>   | <p><b>Centrally acting antitussive:</b></p> <ul style="list-style-type: none"> <li>▶ Dextromethorphan: ≥ 12 years and adults: 15 mg QID</li> </ul>   |
| <p><b>Mucolytics:</b></p> <ul style="list-style-type: none"> <li>▶ Bromhexine: <ul style="list-style-type: none"> <li>■ ≥ 12 years and adults: 8 mg TDS</li> <li>■ Children (5 to ≤ 12 years): 4 mg QID</li> <li>■ Children 2 to ≤ 5 years: 4 mg BD</li> </ul> </li> <li>▶ Ambroxol: ≥ 12 years and adults: 30-60 mg BD</li> <li>▶ Acetylcysteine: ≥ 12 years and adults: 200 mg TDS</li> </ul>   | <p><b>Peripherally acting antitussive:</b></p> <ul style="list-style-type: none"> <li>▶ Benzonatate: Maximum single dose of 200 mg and a total daily dosage of 600 mg</li> <li>▶ Levodropropizine: <ul style="list-style-type: none"> <li>■ ≥ 12 years and adults: 60 mg TDS</li> <li>■ Children (6 to 12 years): 12-30 mg TDS</li> <li>■ Children (2 to 6 years): 12-18 mg TDS</li> </ul> </li> </ul>   |
| <p><b>Bronchodilator:</b></p> <ul style="list-style-type: none"> <li>▶ Levosalbutamol (Nebuliser): <ul style="list-style-type: none"> <li>■ ≥ 12 years and adults: 0.63 mg TDS, can be extended to 1.25 mg TDS</li> <li>■ Children (6-11 years): 0.31 mg TDS</li> </ul> </li> <li>▶ Terbutaline (Nebuliser): <ul style="list-style-type: none"> <li>■ Adults and elderly: 5 or 10 mg BD/QID</li> <li>■ Children (&gt;25kg): 5mg BD/QID</li> </ul> </li> <li>▶ Terbutaline: <ul style="list-style-type: none"> <li>■ Adults and elderly: 2.5-5 mg TDS</li> <li>■ 7 - 15 years: 2.5 mg BD/TDS</li> </ul> </li> <li>▶ Acebrophylline: Adults: 100 mg BD</li> </ul> | <p><b>Antihistamines</b></p> <ul style="list-style-type: none"> <li>▶ Chlorpheniramine maleate: <ul style="list-style-type: none"> <li>■ Adults: 4 mg every 4 to 6 hourly (Maximum 24 mg/ 24 hours; elderly: maximum 12 mg)</li> <li>■ Children (6-12 years): 2 mg every 4 to 6 hourly</li> <li>■ Children (2-6 years): 1mg every 4 to 6 hourly</li> <li>■ Children aged 1-2 years: 1 mg twice daily</li> </ul> </li> <li>▶ Diphenhydramine: ≥ 12 years and adults: 28 mg QID</li> <li>▶ Promethazine: <ul style="list-style-type: none"> <li>■ ≥ 5 years, adults and elderly: 25 mg as a single dose</li> </ul> </li> </ul> |

BD: Twice daily, TDS: Three times a day, QID: Four times a day  
Adapted from: Reference no. 27-41

Fixed dose combinations tend to improve clinical effectiveness in addition to reducing the number of pill and prescriptions, simplified packaging, better patient adherence, and reduced administrative costs. However, irrational drug combinations should be avoided as they add unnecessary adverse effects and cost to the therapy. Here, IMA enlists few cough formulation which are approved by CDSCO for the symptomatic management of dry and productive cough respectively. Judicious use of the formulations is recommended (Table 8 to 15).

### Disclaimer

Fixed Dose Combinations are to be used as per treating physicians' discretion and judgment based on the clinical assessment of the patient. They are recommended for short term use only.

Table 8: Bromhexine Hydrochloride + Guaifenesin + Terbutaline Sulphate

#### CDSKO Approved Indication

- ▶ For the symptomatic relief of bronchospasm in bronchial asthma & chronic bronchitis

#### Available Preparation

- ▶ Syrup: Bromhexine (4 mg/5 ml) + Guaifenesin (50 mg/5 ml) + Terbutaline (1.25 mg/5 ml)
- ▶ Syrup also available in sugar free base






#### Dosage

- ▶ Adults: 2 teaspoonful or 10 ml 3 times a day
- ▶ Children (6-12 years): 1 teaspoon or 5 ml 3-4 times /day
- ▶ Children (2-6 years): ¼ - 1 teaspoonful or 2.5ml 3-4 times a day

#### Mechanism of Action

- ▶ Bromhexine Hydrochloride: Disrupts the structure of acid mucopolysaccharide fibres in mucoid sputum and produces less viscous mucus, makes cough out mucus easily
- ▶ Guaifenesin: Acts as an expectorant by increasing the volume and reducing the viscosity of secretions in the trachea and bronchi
- ▶ Terbutaline: A bronchodilator, dilates air passages in the lungs

#### Usage

|                               |  |           |   |
|-------------------------------|--|-----------|---|
| Pediatric:<br>(above 2 years) |     | Adults:   |  |
| Geriatric:                    |     | Pregnant: |  |
| Lactating females:            |  |           |   |

Note: Green: Yes; Yellow: Use with caution; Orange: No data available

#### Precautions

- ▶ It may cause dizziness and sleepiness, driving should be avoided
- ▶ Not to be administered in patients who are hypersensitive to sympathomimetic amines
- ▶ Terbutaline may interact with beta blockers and certain diuretics

Adapted from: Reference no. 43,44

#### Expert Panel Recommendation

Recommend for use in productive cough conditions for short term use only. There could be an increased side effect risk when administered along with inhalational LABA/SABA. Aid physiotherapy in patients who have difficulty in expulsion of phlegm and cough. Use of mucolytics in advanced airway disease is not advised

#### Disclaimer

For the use of a registered medical practitioner, hospital or laboratory only. To be used as per treating physicians' discretion and judgment based on the clinical assessment of the patient. Drug to drug interaction with concomitant medication needs to be checked for Cough therapy. Children irritability to the therapy needs to be handled carefully

**Table 9: Ambroxol Hydrochloride + Guaifenesin + Levosalbutamol**

**CDSCO Approved Indication**

- ▶ For the symptomatic relief of bronchospasm in bronchial asthma & chronic bronchitis

**Available Preparation**

- ▶ Syrup: Ambroxol hydrochloride (30 mg/5 ml) + Guaifenesin (50 mg/5 ml) + Levosalbutamol (1 mg/5 ml)
- ▶ Also available as drops

**Dosage**

- ▶ Children (6-12 years): Start with 2.5 ml thrice daily and increase to 5 ml of oral syrup 2-3 times daily
- ▶ Adults (>12 years): 5ml three times daily. This may be increased to 10 ml syrup twice daily

**Precautions**






- ▶ Can cause dizziness, hence driving is not advisable
- ▶ If the patient is already on bronchodilator inhalers; adding combination therapy may increase the chances of side effects like tremors and tachycardia

Adapted from: Reference no. 43,45

**Mechanism of Action**

- ▶ **Ambroxol:** Has effective mucokinetic and secretagogue properties
- ▶ **Guaifenesin:** Acts as an expectorant by increasing the volume and reducing the viscosity of secretions in the trachea and bronchi
- ▶ **Levosalbutamol:** Relaxes smooth muscles of all airways, from trachea to terminal bronchioles. Increased c-AMP concentrations are also associated with the inhibition of release of mediators from mast cells in the airways

**Usage**

|                                      |   |                  |  |
|--------------------------------------|---|------------------|--|
| <b>Pediatric:</b><br>(above 6 years) |      | <b>Adults:</b>   |   |
| <b>Geriatric:</b>                    |     | <b>Pregnant:</b> |  |
| <b>Lactating females:</b>            |  |                  |  |

Note: Green: Yes; Yellow: Use with caution; Orange: No data available

**Expert Panel Recommendation**

Recommend for use in productive cough conditions for short term use only. There could be an increased side effect risk when administered along with inhalational LABA/SABA. Aid physiotherapy in patients who have difficulty in expulsion of phlegm and cough. Use of mucolytics in advanced airway disease is not advised

**Disclaimer**

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**Table 10: Ambroxol Hydrochloride + Guaifenesin + Terbutaline Sulphate**

**CDSCO Approved Indication**

For the symptomatic relief of bronchospasm in bronchial asthma & chronic bronchitis

**Available Preparation**

- ▶ Syrup: Ambroxol (15 mg/5 ml) + Guaifenesin (50 mg/5 ml) + Terbutaline (1.25 mg/5 ml)

**Dosage**

- ▶ Adults: 10-20 ml thrice daily
- ▶ Children (6-12 years): 5-10 ml thrice daily
- ▶ Children (2-6 years): 2.5 ml thrice daily

**Precautions**

- ▶ Terbutaline may interact with beta blockers and certain diuretics
- ▶ It should not be used in patients with pre-existing ischaemic heart disease or those patients with significant risk factors for ischaemic heart disease

Adapted from: Reference no. 43,46

**Mechanism of Action**

- ▶ Ambroxol: Stimulation of surfactant synthesis that gives Ambroxol effective mucokinetic and secretagogue properties
- ▶ Guaifenesin: Acts as an expectorant by increasing volume and reducing viscosity of secretions in the trachea and bronchi
- ▶ Terbutaline: A bronchodilator, that dilates air passages in the lungs

**Usage**

Pediatric:  
(above 2 years)



Adults:



Geriatric:



Pregnant:



Lactating females:



Note: Green: Yes; Yellow: Use with caution; Orange: No data available

**Expert Panel Recommendation**

Recommend for use in productive cough conditions for short term use only. There could be an increased side effect risk when administered along with inhalational LABA/SABA. Aid physiotherapy in patients who have difficulty in expulsion of phlegm and cough. Use of mucolytics in advanced airway disease is not advised

**Disclaimer**

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**Table 11: Dextromethorphan Hydrobromide + Chlorpheniramine Maleate**

**CDSCO Approved Indication**

For the temporary relief of cough due to throat irritation, sneezing & running nose

**Available Preparation**

- ▶ Syrup: Dextromethorphan Hydrobromide (10 mg/5 ml) + Chlorpheniramine Maleate (2 mg/5 ml or 4 mg/5 ml)
- ▶ Also available in sugar free base

**Dosage**

- ▶ Adults: 5 ml (one teaspoonful) four times daily
- ▶ Children (above 6 years of age): 2.5 ml (half teaspoonful) four times daily
- ▶ Children (4-6 years of age): 1.25 ml (one-fourth teaspoonful) four times daily

**Mechanism of Action**

- ▶ Dextromethorphan Hydrobromide: It decreases cough but has no narcotic, analgesic or dependence inducing properties works by decreasing the feeling of needing to cough
- ▶ Chlorpheniramine Maleate: Blocks histamine released during an allergic reaction, sedative and anticholinergic properties

**Usage**

Pediatric:  
(above 4 years)



Adults:



Geriatric:



Pregnant:



Lactating females:



Note: Green: Yes; Yellow: Use with caution; Red: No

**Precautions**

- ▶ Should be given with caution to patients with epilepsy, severe cardiovascular disorders, liver disorders, glaucoma, urinary retention and prostatic enlargement
- ▶ Concomitant use of a dextromethorphan-containing product and monoamine oxidase inhibitors (MAOIs) can occasionally result in symptoms such as hyperpyrexia, hallucinations, gross excitation or coma

Adapted from: Reference no. 43,47

**Expert Panel Recommendation**

Recommended in dry cough only. Not to be used in productive or infectious cough. Not recommended in children below 4 years of age. Recommended for short term use only

**Disclaimer**

For the use of a registered medical practitioner, hospital or laboratory only. To be used as per treating physicians' discretion and judgment based on the clinical assessment of the patient. Drug to drug interaction with concomitant medication needs to be checked for Cough therapy. Children irritability to the therapy needs to be handled carefully

**Table 12: Dextromethorphan Hydrobromide + Chlorpheniramine maleate + Phenylephrine hydrochloride**

**CDSCO Approved Indication**

For the treatment of common cold and cough

**Available Preparation**

- ▶ Syrup: Dextromethorphan Hydrobromide 10 mg/5 ml + Chlorpheniramine Maleate 2 mg/5 ml + Phenylephrine Hydrochloride 5 mg/5 ml

**Dosage**

- ▶ Adults: 10 ml thrice daily
- ▶ Children (7–12 years): 5 ml thrice daily
- ▶ Children (4–6 years): 2.5 ml thrice daily

**Precautions**






- ▶ Concomitant use of a dextromethorphan-containing product and monoamine oxidase inhibitors (MAOIs) can occasionally result in symptoms such as hyperpyrexia, hallucinations, gross excitation or coma
- ▶ Should be avoided in patients with liver disease

Adapted from: Reference no. 43,48

**Mechanism of Action**

- ▶ Dextromethorphan Hydrobromide: It reduces cough but has no narcotic, analgesic or dependence inducing properties works by decreasing the feeling of needing to cough
- ▶ Chlorpheniramine Maleate: It works by blocking histamine released during an allergic reaction. It provides relief in cough due to their sedative and anticholinergic actions
- ▶ Phenylephrine hydrochloride: Is an agonist of  $\alpha$ 1-adrenoceptors. This causes vasoconstriction, which leads to decreased edema and increased drainage of the sinus cavities

**Usage**

|                               |   |           |   |
|-------------------------------|---|-----------|---|
| Pediatric:<br>(above 4 years) |      | Adults:   |   |
| Geriatric:                    |    | Pregnant: |  |
| Lactating females:            |  |           |   |

Note: Green: Yes; Yellow: Use with caution; Orange: No data available

**Expert Panel Recommendation**

Recommended in dry cough only. Not to be used in productive or infectious cough. Not recommended in children below 4 years of age. Recommended for short term use only

**Disclaimer**

For the use of a registered medical practitioner, hospital or laboratory only. To be used as per treating physicians' discretion and judgment based on the clinical assessment of the patient. Drug to drug interaction with concomitant medication needs to be checked for cough therapy. Children irritability to the therapy needs to be handled carefully

Table 13: Levodropropizine + Chlorpheniramine Maleate

#### CDSCO Approved Indication

For the treatment of non-productive cough

#### Available Preparation

- ▶ Syrup: Levodropropizine (30mg/5ml) + Chlorpheniramine Maleate (2 mg/5 ml)
- ▶ Syrup: Levodropropizine (30 mg/5 ml) also available

#### Dosage

Adults: 5-10 ml three times a day

#### Precautions

- ▶ Not recommended to use if you have high blood pressure (hypertension), any underlying serious heart condition or cardiovascular disorder, any history of stomach ulcers or overactive thyroid (hyperthyroidism)
- ▶ To be avoided if you are taking antidepressant drugs

Adapted from: Reference no. 43,49,50

#### Mechanism of Action

- ▶ Levodropropizine: Inhibits afferent pathways involved in cough reflex generation
- ▶ Chlorpheniramine Maleate: Blocks histamine released during an allergic reaction, a chemical messenger that causes cough

#### Usage

Pediatric:



Adults:



Geriatric:



Pregnant:



Lactating females:



Note: Green: Yes; Orange: No data available; Yellow: Use with caution. Safety and efficacy of fixed - dose combination of levodropropizine and chlorpheniramine maleate has not been established in children.

#### Expert Panel Recommendation

Recommended in dry cough only. Not to be used in productive or infectious cough. Not recommended in children below 2 years of age. Recommended for short term use only.

#### Disclaimer

For the use of a registered medical practitioner, hospital or laboratory only. To be used as per treating physicians' discretion and judgment based on the clinical assessment of the patient. Drug to drug interaction with concomitant medication needs to be checked for Cough therapy. Children irritability to the therapy needs to be handled carefully

**Table 14: Chlorpheniramine Maleate + Phenylephrine + Paracetamol**

**CDSCO Approved Indication**

Treatment of common cold and cough associated with fever

**Available Preparation**

- ▶ Oral Suspension: Chlorpheniramine Maleate (0.5 mg/5 ml) + Phenylephrine (5 mg/5 ml) + Paracetamol (125 mg/5 ml)

**Dosage**

- ▶ Adults: 10 ml thrice a day
- ▶ Children (2-4 years): 2.5 ml thrice a day
- ▶ Children (4-12 years): 5 ml thrice a day






**Precautions**

- ▶ Chlorpheniramine/phenylephrine-contraindicated in asthma attacks, narrow-angle glaucoma, symptomatic prostate hypertrophy, bladder-neck obstruction and stenosis
- ▶ Should be avoided in patients with liver disease

**Mechanism of Action**

- ▶ Chlorpheniramine Maleate: Blocks histamine released during an allergic reaction, sedative and anticholinergic properties
- ▶ Phenylephrine hydrochloride: An agonist of  $\alpha_1$ -adrenoceptors, causes vasoconstriction, which leads to decreased edema and increased drainage of the sinus cavities
- ▶ Paracetamol: A poor inhibitor of PG synthesis in peripheral tissues, but more active on COX in the brain

**Usage**

|                                      |   |                  |  |
|--------------------------------------|---|------------------|--|
| <b>Pediatric:</b><br>(above 2 years) |      | <b>Adults:</b>   |   |
| <b>Geriatric:</b>                    |     | <b>Pregnant:</b> |  |
| <b>Lactating females:</b>            |  |                  |  |

Note: Green: Yes; Yellow: Under doctor's recommendation/with caution

Adapted from: Reference no. 43,51

**Expert Panel Recommendation**

Recommended in cough associated with cold and fever. Only to be used in children and to be avoided in children below 2 years of age. Recommended for short term use only

**Disclaimer**

For the use of a registered medical practitioner, hospital or laboratory only. To be used as per treating physicians' discretion and judgment based on the clinical assessment of the patient. Drug to drug interaction with concomitant medication needs to be checked for Cough therapy. Children irritability to the therapy needs to be handled carefully

**Table 15: Ambroxol Hydrochloride**

**CDSCO Approved Indication**

Respiratory disorder with viscous cough

**Mechanism of Action**

▶ **Ambroxol:** Has effective mucokinetic and secretagogue properties

**Available Preparation**

- ▶ Tablet: 30 mg
- ▶ Syrup: 30 mg/5 ml
- ▶ Drops: 7.5 mg/ml

**Dosage**

- ▶ Adult dose: 10 ml three times a day
- ▶ Children (above 5 years): 5 ml measure, 2-3 times a day
- ▶ Children (2-5 years): 2.5 ml measure, 3 times a day

**Usage**

**Pediatric:**  
(contraindicated in below 2 years)



**Adults:**



**Geriatric:**



**Pregnant:**



**Lactating females:**



*Note: Green: Yes; Yellow: Use with caution; Orange: No data available*

**Precautions**

▶ Severe skin reactions may occur, if present, ambroxol treatment should be discontinued immediately and medical advice should be sought

Adapted from: Reference no. 41,43

**Expert Panel Recommendation**

To be used in patients above 2 years only. Aid physiotherapy in patients who have difficulty in expulsion of phlegm and cough. Use of mucolytics in advanced airway disease is not advised. Recommended for short term use only

**Disclaimer**

For the use of a registered medical practitioner, hospital or laboratory only. To be used as per treating physicians' discretion and judgment based on the clinical assessment of the patient. Drug to drug interaction with concomitant medication needs to be checked for Cough therapy. Children irritability to the therapy needs to be handled carefully

## Referral to a Specialist

It is crucial to refer the patient to a doctor for further diagnosis because a cough can be a sign of a serious medical condition like pneumonia.<sup>52</sup> The situations that call for a referral for a patient presenting cough are listed below

- Coughing for more than 2 weeks
- Coughing at night
- Underlying chronic disease
- Sputum with blood or is brown, yellow, and green
- Aspiration of foreign objects
- Cough presenting as an adverse effect

In pediatric population, referral to a specialist by general practitioners should be considered in following situations:

- Cough causing inability to feed or sleep in an infant
- Infants having apnea or cyanosis during paroxysms of coughing
- Persistent fever and vomiting
- Child who has had an episode of choking indicative of a possible inhaled foreign body
- Recurrent, partially resolved or prolonged (>3 months) protracted bacterial bronchitis
- Chronic wet cough unresponsive to antimicrobial therapy or cough associated with persistent hypoxemia
- Prominent dyspnea, particularly at rest or at night
- Significant contacts with Tuberculosis or pertussis
- Suspicion of congenital/developmental defect

## Conclusion

- Cough (that may be acute, sub-acute or chronic) represents one of the most common reasons because of which adult as well as pediatric patients seek medical assistance.
- A thorough medical and family history along with nature of cough and sputum may give crucial diagnostic insights that enable targeted therapy.
- The algorithm for acute/sub-acute, chronic and pediatric cough, which stresses a gradual approach and follow-up, is beneficial.
- There are a variety of over-the-counter medications that are said to be beneficial in the treatment of cough, including antitussives, antihistamines, decongestants, expectorants among others.
- Numerous combination therapies for non-productive cough and productive cough are available in the Indian market such as combinations of dextromethorphan with antihistamines, decongestants, expectorants, and/or antipyretics. However, the combination therapies should be used judiciously and irrational drug combinations should be avoided.
- In certain situations, it is crucial to refer the patient to a specialist for additional evaluation since a cough might indicate a dangerous medical condition such as pneumonia.
- The implementation of this stepwise evidence-based approach can assist healthcare practitioners and specialists in directing the use of suitable diagnostic modalities and initiating prompt treatment based on clinical symptoms for improved cough control in both adult and pediatric populations.



## References

1. Sharma S, Hashmi MF, Alhajjaj MS. Cough. 2022 May 15. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. PMID: 29630273.
2. Apte K, Madas S, Barne M, Chhowala S, Gogtay J, Salvi S. Prevalence of cough and its associated diagnoses among 204,912 patients seen in primary care (PC) in India.
3. Narayanan V, Pawar S, Rege P. Patient profile and prevailing trends of cough management in India: Results of the COFPRO Survey. *The Indian Practitioner*. 2017;70(10):17-24.
4. Morice AH, Millqvist E, Bieksiene K, Birring SS, Dicipinigaitis P, Ribas CD, Boon MH, Kantar A, Lai K, McGarvey L, Rigau D. ERS guidelines on the diagnosis and treatment of chronic cough in adults and children. *European Respiratory Journal*. 2020 Jan 1;55(1).
5. Irwin RS, Baumann MH, Bolser DC, Boulet LP, Braman SS, Brightling CE, Brown KK, Canning BJ, Chang AB, Dicipinigaitis PV, Eccles R. Diagnosis and management of cough executive summary: ACCP evidence-based clinical practice guidelines. *Chest*. 2006 Jan 1;129(1):15-23S.
6. Irwin RS. Complications of cough: ACCP evidence-based clinical practice guidelines. *Chest*. 2006 Jan 1;129(1):54S-8S.
7. Iyer RK, Joshi JM. Future drugs for the treatment of dry cough. *J Assoc Physicians India*. 2013 May;61(5 Suppl):14-6. PMID: 24490444.
8. Swain SK, Munjal S, Pradhan S. Pediatric Cough. *Apollo Medicine*. 2019 Apr 1;16(2):87.
9. Guleria R, Dhar R, Mahashur A, Ghoshal AG, Jindal SK, Talwar D, Prabhudesai P, Abhayankar N, Paramesh H, Balamurugan S. Indian consensus on diagnosis of cough at primary care setting. *The Journal of the Association of Physicians of India*. 2019 Jan;67(1):92-8.
10. Paramesh H, Nimain M, Vijay K, Vikram P, Rohit R, Gaurav P, Rishi J. Cough profile and trends in cough management in children across India: Results of a multi-centric, cross-sectional survey. *Journal of the Pediatrics Association of India*. 2019 Jan 1;8(1):18.
11. Cough. National Health Portal Of India. Available at <https://www.nhp.gov.in/disease/respiratory/respiratory-tract/cough>
12. Ebell MH. Predicting pneumonia in adults with respiratory illness. *American family physician*. 2007 Aug 15;76(4):560.
13. Hamdan AL, Jabour J, Azar ST. Goiter and laryngeal sensory neuropathy. *International Journal of Otolaryngology*. 2013 May 29;2013.
14. Lai K, Tang J, Zhan W, Li H, Yi F, Long L, Zhou J, Chen X, Huang L, Sun Z, Jiang Z. The spectrum, clinical features and diagnosis of chronic cough due to rare causes. *Journal of Thoracic Disease*. 2021 Apr;13(4):2575.
15. Smith JA, Ashurst HL, Jack S, Woodcock AA, Earis JE. The description of cough sounds by healthcare professionals. *Cough*. 2006 Dec;2(1):1-9.
16. Swain SK, Munjal S, Pradhan S. Pediatric Cough. *Apollo Medicine*. 2019 Apr 1;16(2):87.
17. Chang AB. Chronic non-specific cough in children. *Paediatrics and Child Health*. 2008 Jul 1;18(7):333-9.
18. Irwin RS, French CL, Chang AB, Altman KW, Adams TM, Azoulay E, Barker AF, Birring SS, Blackhall F, Bolser DC, Boulet LP. Classification of cough as a symptom in adults and management algorithms: CHEST guideline and expert panel report. *Chest*. 2018 Jan 1;153(1):196-209.
19. Wang Z, Wang M, Wen S, Yu L, Xu X. Types and applications of cough-related questionnaires. *Journal of Thoracic Disease*. 2019 Oct;11(10):4379.
20. Papanikolaou IC, Tsenempi XA. Tropical Lung Diseases. In: *Hunter's Tropical Medicine and Emerging Infectious Diseases 2020* Jan 1 (pp. 1-7). Elsevier.
21. Malesker MA, Callahan-Lyon P, Ireland B, Irwin RS, Adams TM, Altman KW, et al. Pharmacologic and nonpharmacologic treatment for acute cough associated with the common cold: CHEST Expert Panel Report. *Chest*. 2017;152(5):1021-37.
22. Corteville DC, Bibbins-Domingo K, Wu AH, Ali S, Schiller NB, Whooley MA. N-Terminal Pro-B-Type Natriuretic Peptide as a Diagnostic Test for Ventricular Dysfunction in Patients With Coronary Disease: Data From the Heart and Soul Study. *Archives of internal medicine*. 2007 Mar 12;167(5):483-9.
23. Li Y, Min L, Zhang X. Usefulness of procalcitonin (PCT), C-reactive protein (CRP), and white blood cell (WBC) levels in the differential diagnosis of acute bacterial, viral, and mycoplasmal respiratory tract infections in children. *BMC Pulmonary Medicine*. 2021 Dec;21(1):1-8.
24. JOSE RA, GOPAL K, SAMUEL JOHNSON AK, JOHNSON SAMUEL JA, ABRAHAM SS, GOSWAMI T, THOMAS M, MATHEW R. Evaluation of Truenat MTB/RIF Test in Comparison with Microscopy and Culture for Diagnosis of Extrapulmonary Tuberculosis in a Tertiary Care Centre. *Journal of Clinical & Diagnostic Research*. 2021 Jan 1;15(1).
25. Morice AH, McGarvey L, Pavord I. Recommendations for the management of cough in adults. *Thorax*. 2006 Sep 1;61(suppl 1):i1-24.
26. Turner RD, Bothamley GH. Chronic cough and a normal chest X-ray - a simple systematic approach to exclude common causes before referral to secondary care: a retrospective cohort study. *NPJ Prim Care Respir Med*. 2016 Mar 3;26:15081.
27. Kardos P. Management of cough in adults. *Breathe*. 2010;7(2):122-33.
28. MUCOPHYLIN Capsules (Acebrophylline). Summary of product characteristics.
29. Acetylcysteine (200mg Powder for Oral Solution). Summary of product characteristics.
30. TESSALON® (Perles 200 mg Capsules). Summary of product characteristics.
31. Bisolvon 4mg/5ml Oral Solution (Bromhexine hydrochloride). Summary of product characteristics.
32. Piriton Syrup (Chlorphenamine maleate). Summary of product characteristics.
33. Benylin Dry Coughs 7.5mg / 5ml Syrup (Dextromethorphan hydrobromide). Summary of product characteristics.
34. Benylin Chesty Coughs (Original): Diphenhydramine hydrochloride. Summary of product characteristics.

35. Robitussin Chesty Cough Medicine (Guaifenesin). Summary of product characteristics.
36. Hactosec syrup (Levodropropizine). Summary of product characteristics.
37. LEVOLIN Respules (Levosalbutamol sulphate). Summary of product characteristics.
38. Phenergan 25 mg tablets (Promethazine hydrochloride). Summary of product characteristics.
39. Terbutaline Sulphate (Nebuliser Solution). Summary of product characteristics.
40. Bricanyl Tablets 5mg (Terbutaline sulfate). Summary of product characteristics.
41. SEKROL® (Ambroxol hydrochloride). Summary of product characteristics.
42. Boujaoude ZC, Pratter MR. Clinical approach to acute cough. Lung. 2010 Jan;188(1):41-6.
43. Tripathi KD. Essentials of medical pharmacology. JP Medical Ltd; 2013 Sep 30.
44. ALKOF+ (Terbutaline Sulphate, Guaiphenesin, Bromhexine Hydrochloride and Menthol) Syrup. Summary of product characteristics.
45. ASTHALIN AX (Levosalbutamol Sulphate, Guaiphenesin and Ambroxol Hydrochloride) Syrup. Summary of product characteristics.
46. Trump A (Ambroxol HCl, Guaiphenesin and Terbutaline sulphate) Syrup. Summary of product characteristics.
47. PIRITON CS (Chlorpheniramine Maleate with Dextromethorphan Hydrobromide) Syrup. Summary of product characteristics.
48. SILDEC PE DM (Chlorpheniramine maleate, Phenylephrine hydrochloride and Dextromethorphan hydrobromide) Syrup. Summary of product characteristics.
49. Reswas (Levodropropizine and Chlorpheniramine Maleate) Syrup. Package insert.
50. Justkof ZM (Levodropropizine and Chlorpheniramine Maleate) Syrup.
51. Sinarest (Chlorpheniramine Maleate, Phenylephrine, Paracetamol and Sodium Citrate) Syrup. Summary of product characteristics.
52. Ganga NP. The Therapeutic Applications of Cough Medicines in Respiratory Diseases. International Journal Of Pharmaceutical And Phytopharmacological Research. 2021;11(3):6-10.



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