

Chronic Cough in Children

From evaluation to targeted management
with a focus on allergic cough

Masoud Movahedi, MD

Professor of Allergy & Clinical Immunology
CMC, Tehran University of Medical Sciences



1 Definition and burden

2 A child-centered diagnostic pathway

3 Differential diagnosis by cough phenotype

4 Allergic cough, rhinitis and asthma

5 Targeted investigations

6 Management and clinical cases

7 Key messages

Chronic cough in children

> 4 weeks

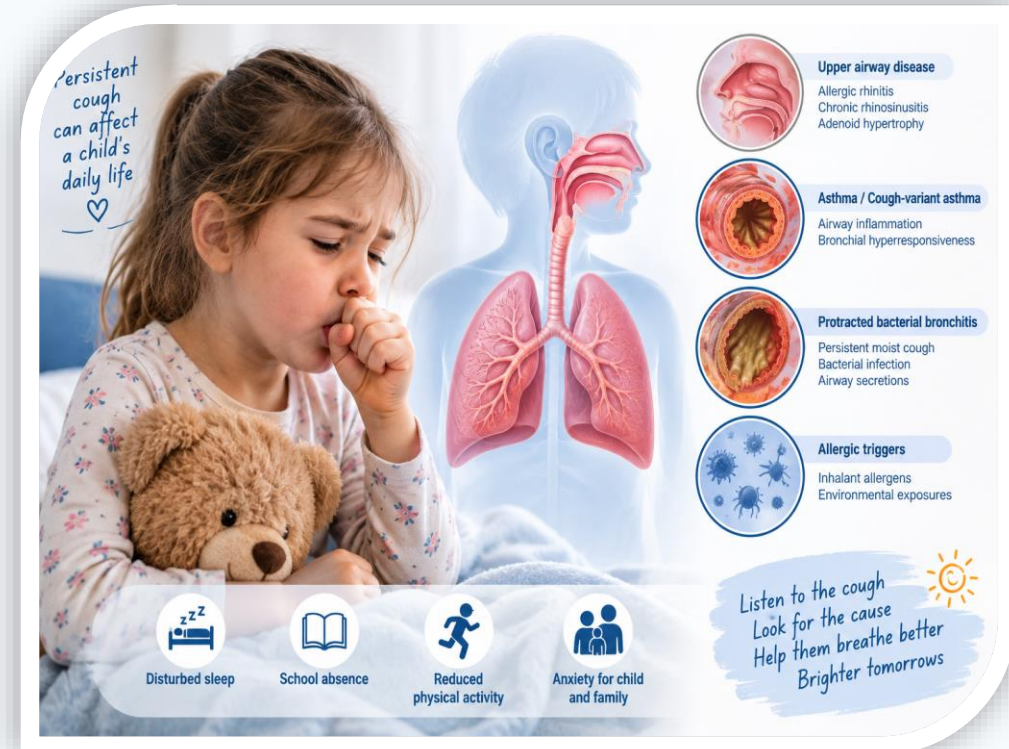
A daily cough lasting longer than four weeks warrants a structured, child-specific evaluation.



Epidemiology and burden

04

- Chronic cough affects approximately 5–10% of school-aged children in population studies.
- It is a frequent reason for pediatric respiratory and allergy consultation.
- Etiology varies with age, geography, exposure and referral setting.
- Persistent cough can disrupt sleep, school attendance, activity and family quality of life.



Impact on the child and family

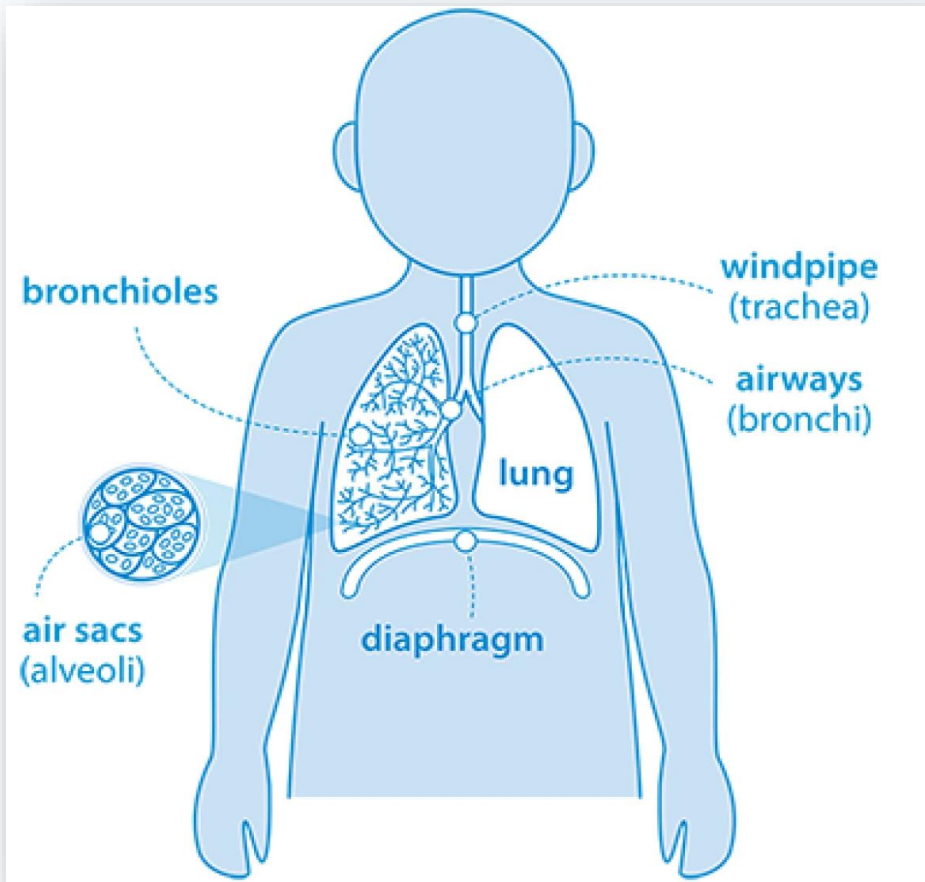
05

- Sleep disruption and daytime fatigue
- School absence and impaired concentration
- Reduced exercise and play
- Anxiety for the child and caregivers
- Repeated visits, tests and medications
- Lower child and family quality of life



Cough physiology

06



Trigger zone

Upper and lower airway receptors

Afferent pathway

Vagus nerve to brainstem

Central processing

Brainstem and cortical modulation

Efferent response

Glottic closure and expiratory muscles

First branch: wet or dry cough?

07

Wet cough

Suggests airway secretions

- Protracted bacterial bronchitis
- Bronchiectasis
- Chronic suppurative lung disease
- Aspiration or infection

Dry cough

Suggests non-suppurative pathways

- Asthma or cough-variant asthma
- Upper airway cough syndrome
- Post-infectious cough
- Habit/tic cough

History taking: high-yield questions

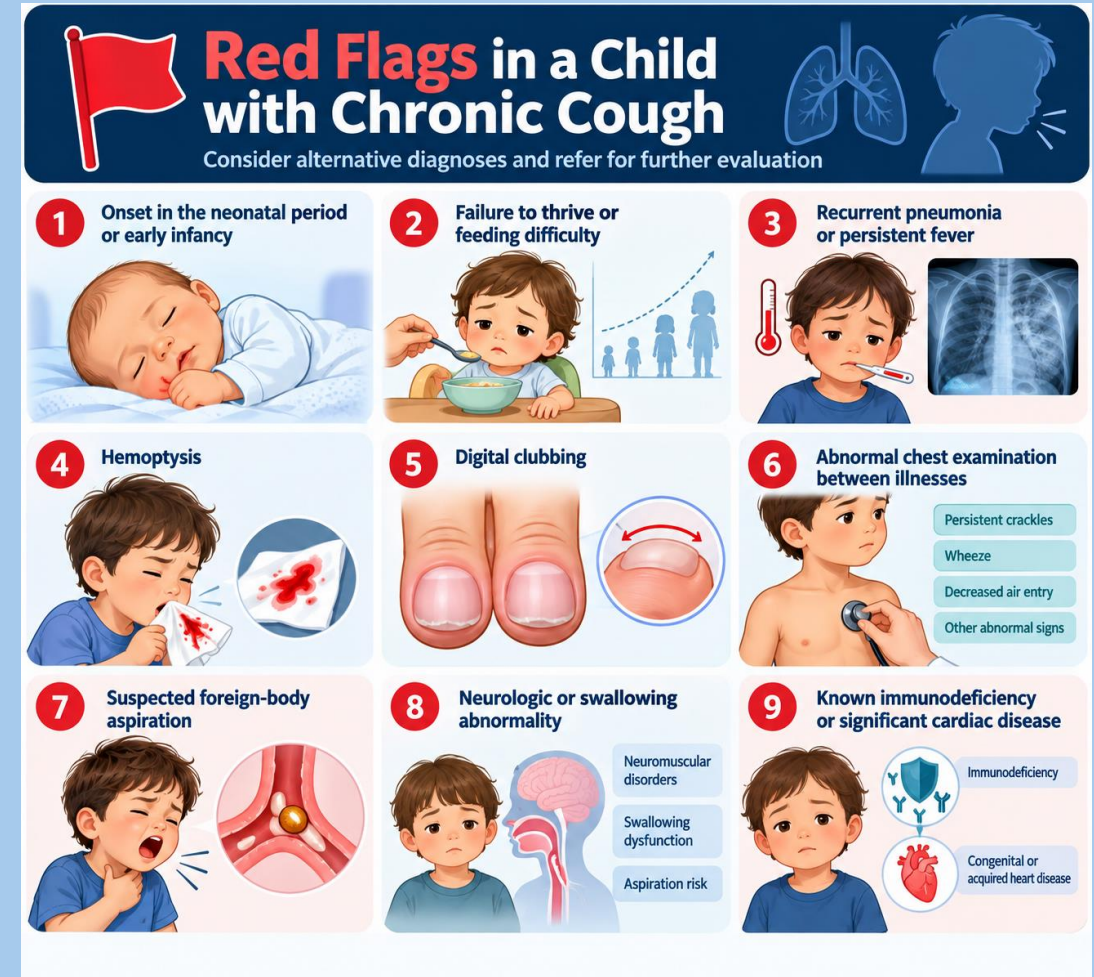
08

- Onset, duration and temporal pattern
- Wet, dry, barking, staccato or paroxysmal quality
- Triggers: exercise, cold air, allergens, meals or infection
- Associated wheeze, dyspnea, rhinitis, fever, reflux or choking
- Environmental exposure to smoke, vaping, dampness, pets and pollutants
- Past asthma, atopy, aspiration, infection and prematurity
- Medication history, including ACE inhibitors in adolescents

Red flags

09

- Onset in the neonatal period or early infancy
- Failure to thrive or feeding difficulty
- Recurrent pneumonia or persistent fever
- Hemoptysis
- Digital clubbing
- Abnormal chest examination between illnesses
- Suspected foreign-body aspiration
- Neurologic or swallowing abnormality
- Known immunodeficiency or significant cardiac disease





Physical Examination in a Child with Chronic Cough

A Systematic Approach

1 Growth, vital signs



-  Growth trajectory
-  Respiratory rate
-  Oxygen saturation

2 ENT examination

Nasal mucosa, secretions, tonsils and adenoids



-  Nasal mucosa and secretions
-  Tonsils
-  Adenoids (when indicated)

3 Chest examination

Chest shape, air entry, wheeze, crackles and asymmetry



-  Chest shape
-  Air entry
-  Wheeze
-  Crackles
-  Asymmetry

4 Clubbing, cyanosis or chest deformity

-  Clubbing
-  Cyanosis
-  Chest deformity (e.g. pectus)

5 Atopic stigmata

Atopic dermatitis and allergic shiners

-  Atopic dermatitis
-  Allergic shiners (Dennie-Morgan folds)

6 Additional systems

Cardiac, neurologic and swallowing assessment when indicated

-  Cardiac examination
-  Neurologic assessment
-  Swallowing assessment

Look beyond the lungs

— A thorough physical examination helps identify the underlying cause of chronic cough.

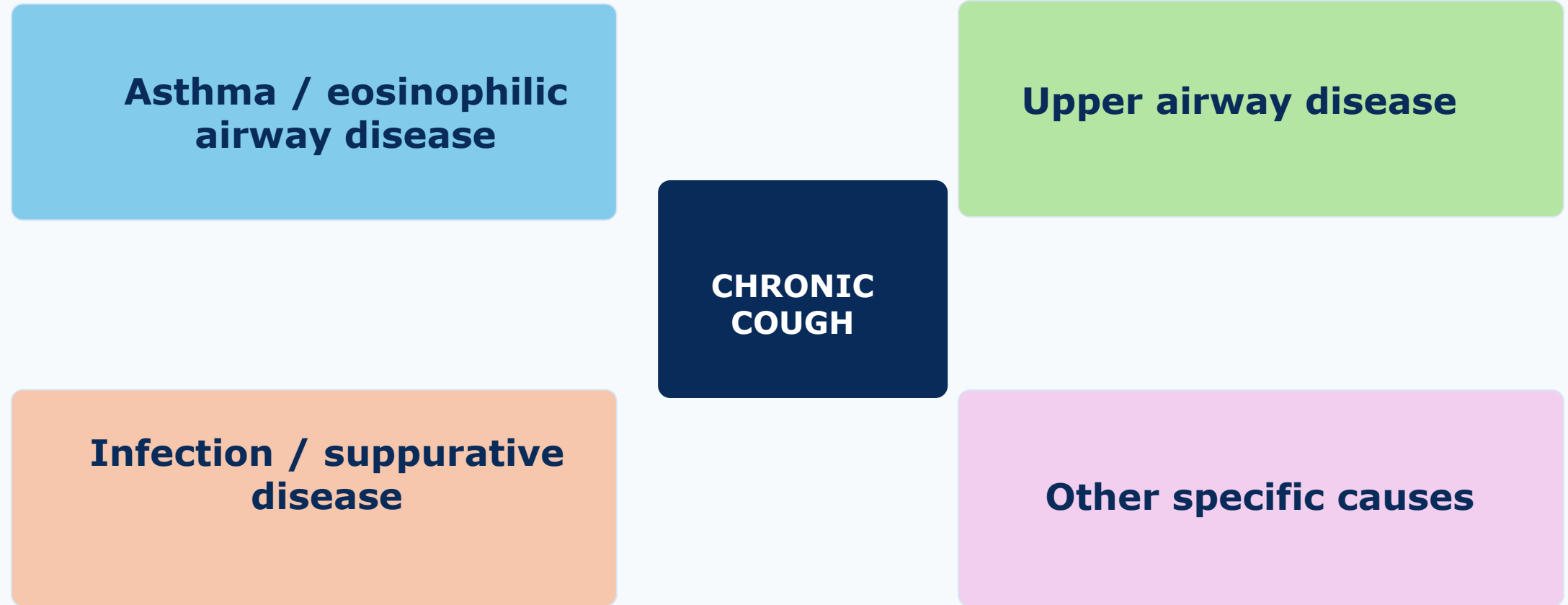


Healthier Breathing
Brighter Tomorrows



Differential diagnosis: an age- and phenotype-based view

11



Upper airway cough syndrome

12

- Consider allergic rhinitis or chronic rhinosinusitis when nasal symptoms are prominent.
- Clues include obstruction, rhinorrhea, sneezing, itching and postnasal symptoms.
- Adenoid hypertrophy may contribute in younger children.
- The label is descriptive. Confirm and treat the underlying nasal disorder.
- Coexisting asthma remains common and should be assessed separately.



Asthma and cough-variant asthma

13

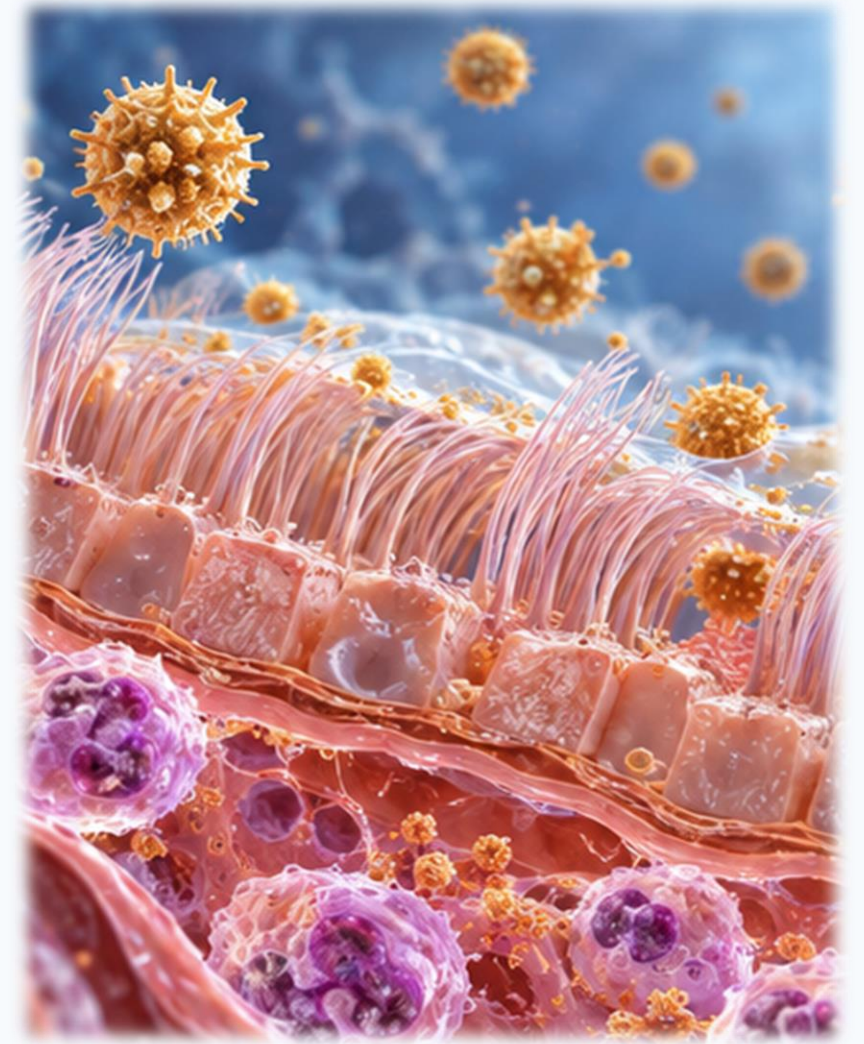
- Cough can be the predominant or only reported symptom.
- Look for variable airflow limitation or airway hyper responsiveness.
- Supportive clues: exercise, cold air, allergens, nocturnal symptoms and atopy.
- Objective testing is preferred when age and cooperation allow.
- A time-limited inhaled corticosteroid trial requires predefined outcomes and review.



Allergic airway disease: diagnostic evidence

14

- A compatible history of allergic rhinitis, conjunctivitis or atopic dermatitis
- Symptoms linked to relevant aeroallergen exposure
- Sensitization that matches the clinical history
- Type 2 inflammation markers can support, but do not establish, the diagnosis
- Improvement after a targeted anti-inflammatory treatment trial



Protracted bacterial bronchitis

15

- Chronic wet cough lasting more than four weeks
- Absence of alternative specific-cough pointers
- Cough resolves after an adequate antibiotic course
- Common organisms include *H. influenzae*, *S. pneumoniae* and *M. catarrhalis*
- Recurrence or poor response prompts evaluation for bronchiectasis, aspiration, immune deficiency or primary ciliary dyskinesia



Other important causes

16

- Foreign-body aspiration
- Bronchiectasis or chronic suppurative lung disease
- Tuberculosis and other chronic infections
- Aspiration and swallowing dysfunction
- Primary ciliary dyskinesia or cystic fibrosis
- Habit or tic cough
- Interstitial lung disease, cardiac disease and airway malacia

Diagnostic approach

17



Baseline chest radiograph and spirometry, when age-appropriate, are commonly recommended. Further tests depend on cough pointers.

Investigations: only when they answer a question

18

- **Chest radiograph**
- **Spirometry with bronchodilator response, usually feasible from 5–6 years**
- **FeNO as a marker of type 2 airway inflammation**
- **Skin-prick testing or serum specific IgE for suspected allergic triggers**
- **Sinus evaluation when chronic rhinosinusitis is suspected**
- **Sputum culture in a productive wet cough when obtainable**
- **Bronchoscopy, chest CT, swallow study, pH-impedance or immune work-up for selected cases**



Investigations

in a Child with Chronic Cough

Targeted
Stepwise
Individualized



1

Chest radiograph

Evaluate for infection, structural abnormality or other pathology.



2

Spirometry with bronchodilator response

Usually feasible from 5–6 years.



3

FeNO

A non-invasive marker of type 2 airway inflammation.



4

Allergy testing

Skin-prick testing or serum specific IgE for suspected allergic triggers.



5

Sinus evaluation

When chronic rhinosinusitis is suspected.



6

Sputum culture

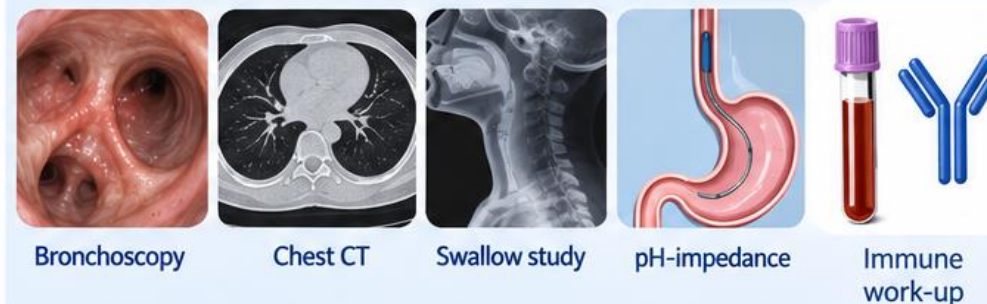
In a productive (wet) cough when obtainable.



7

Additional tests for selected cases

Bronchoscopy, chest CT, swallow study, pH-impedance or immune work-up based on clinical suspicion.



Find the cause. Guide the treatment. Improve the child's life.

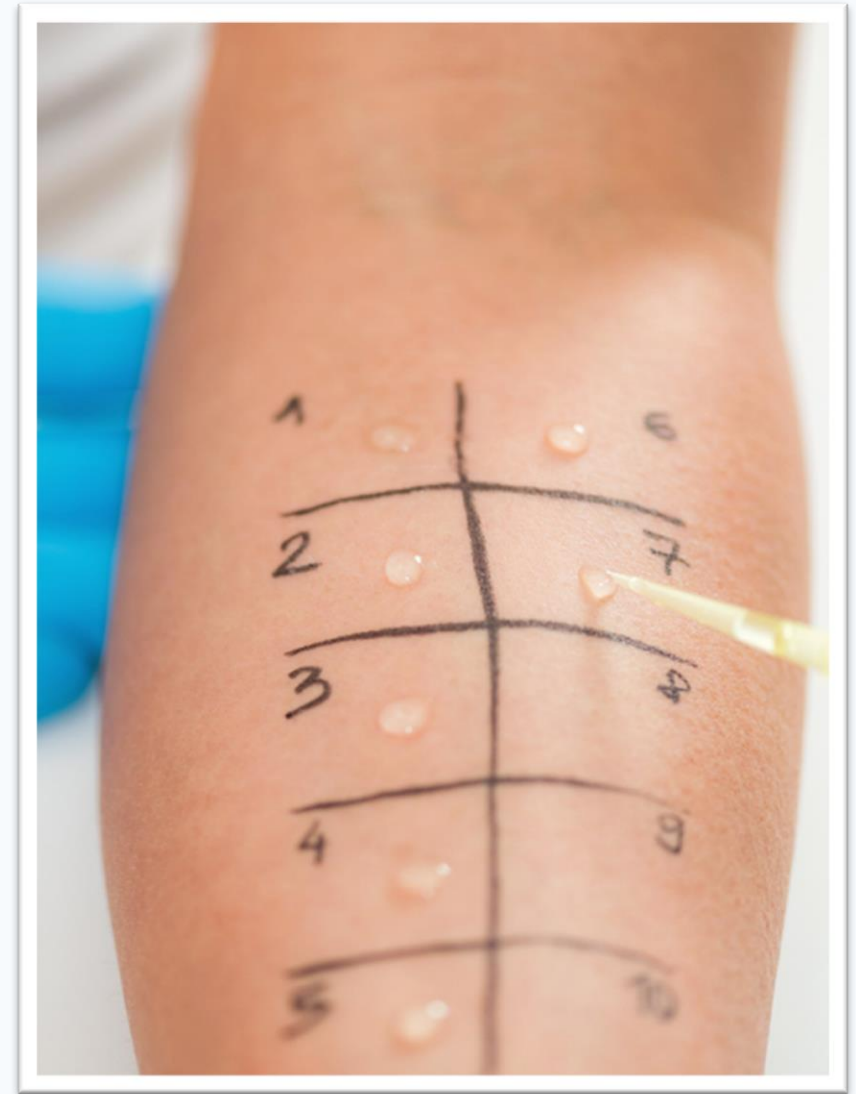
A healthier tomorrow
for every child 

- FeNO reflects type 2 airway inflammation, especially IL-4/IL-13 activity.
- Higher values increase the likelihood of eosinophilic asthma and corticosteroid responsiveness.
- Age, atopy, allergic rhinitis, recent infection and inhaled corticosteroids affect interpretation.
- Use FeNO alongside symptoms, spirometry and treatment response.
- FeNO cannot identify every cause of chronic cough.

Allergy testing

20

- Skin-prick testing is preferred when feasible and safe.
- Serum specific IgE is useful when skin testing cannot be performed.
- Test only allergens suggested by age, geography and exposure history.
- A positive result shows sensitization, not necessarily clinical disease.
- Use results to guide environmental control and, in selected patients, allergen immunotherapy.



Management Principles for Chronic Cough in Children

Targeted care
Healthier breaths
Brighter tomorrow's ♥

1

Treat the cause or the most likely treatable trait.

Identify and manage the underlying condition (e.g. PBB, asthma, allergic rhinitis, GERD, etc.).



2

Reduce environmental exposures.

Minimize tobacco smoke, vaping, dampness and relevant allergen exposure.



3

Teach correct technique.

Ensure proper inhaler and intranasal-spray technique.



Inhaler technique



Intranasal-spray technique



Right technique
Better results

4

Define treatment goals before starting.

Explain to the child and family what improvement should look like (e.g. less frequent cough, improved sleep, return to school and activity).



- ✓ Cough frequency
- ✓ Sleep quality
- ✓ Daily activity
- ✓ School attendance

5

Review and assess response.

Follow up at the appropriate time:



Protracted bacterial bronchitis (PBB)



Anti-inflammatory trials (e.g. asthma, UACS)

Reassess
Adjust
Move forward

6

Stop ineffective treatment and reconsider the diagnosis.

If there is no clear benefit, discontinue the treatment and re-evaluate the diagnosis and next steps.



Every therapeutic trial needs a defined goal, timeframe, and reassessment.



Healthier Children
Brighter Tomorrow's ♥

Treatment of allergic rhinitis-associated cough

22

1

Intranasal corticosteroid

Most effective single agent for persistent nasal symptoms

2

INCS + intranasal antihistamine

Faster and greater relief for moderate-to-severe symptoms

3

Oral antihistamine

Useful for itching, sneezing and ocular symptoms

4

Saline irrigation

Safe adjunct for secretion clearance

5

Allergen immunotherapy

Selected patients with clinically relevant sensitization

Treatment of asthma / cough-variant asthma

23

- Use an age-appropriate ICS-containing regimen based on GINA 2026.
- Check diagnosis, adherence, technique and exposures before stepping up.
- Choose the lowest regimen that maintains symptom and exacerbation control.
- Treat coexisting allergic rhinitis and other modifiable comorbidities.
- Reassess symptoms, exacerbations, lung function and adverse effects.
- Refer for phenotype assessment when asthma remains uncontrolled despite optimized therapy.



- Intranasal corticosteroid for persistent or moderate-to-severe allergic rhinitis
- Intranasal corticosteroid plus intranasal antihistamine when symptoms need stronger control
- Second-generation oral antihistamine for selected intermittent symptoms
- Saline irrigation and correct spray technique
- ENT assessment for obstructive adenoids, anatomic disease or refractory chronic rhinosinusitis
- Allergen immunotherapy in carefully selected patients

- Use an appropriate antibiotic course, commonly amoxicillin–clavulanate, guided by local resistance and allergy history.
- Two weeks is often sufficient; some children require up to four weeks.
- Confirm resolution of wet cough after treatment.
- Repeated episodes or treatment failure require further evaluation.
- Consider bronchiectasis, airway abnormality, aspiration, immune deficiency and primary ciliary dyskinesia.

Environmental control: precise, relevant and feasible

26

- Eliminate tobacco smoke and vaping exposure.
- Address dampness and visible mold.
- Reduce exposure only to allergens that are clinically relevant.
- Use integrated dust-mite measures when indicated; a single intervention rarely suffices.
- Avoid fragrances and combustion pollutants that clearly trigger symptoms.
- Protect normal activity: controlled asthma should allow exercise and play.



Clinical case 1

27

A 7-year-old boy

Three months of dry cough, worse at night and with exercise. He has allergic rhinitis and no fever or wet cough.

1. What findings would increase the probability of asthma?

2. Which objective tests are feasible?

3. How would you structure and assess a treatment trial?



- Ask about variability, exercise limitation, wheeze, nocturnal symptoms and allergen exposure.
- Perform spirometry with bronchodilator response; add FeNO when available.
- Assess rhinitis and confirm clinically relevant sensitization.
- Start an age-appropriate ICS-containing strategy if asthma is likely.
- Provide inhaler training and a written plan.
- Review response and objective measures within 4–8 weeks.

A 4-year-old girl

Two months of daily wet cough. Growth is normal, fever is absent and two previous short antibiotic courses gave only transient improvement.

1. What specific-cough pointers should you seek?
2. What baseline investigations are appropriate?
3. How would you confirm or challenge a diagnosis of PBB?



- Check for choking, recurrent pneumonia, clubbing, feeding problems and abnormal auscultation.
- Obtain a chest radiograph; spirometry if feasible.
- If no alternative pointer exists, use an adequate antibiotic course for suspected PBB.
- Document whether the wet cough fully resolves.
- If response is incomplete or episodes recur, investigate bronchiectasis, aspiration, airway lesion, immune deficiency and PCD.

Stepwise summary

31

1

Phenotype

Wet or dry?

2

Safety

Red flags?

3

Probability

Common
causes

4

Evidence

Targeted tests

5

Action

Treat +
review

Every empiric treatment needs a stop date, an outcome measure and a reassessment plan.

- Chang AB, Oppenheimer JJ, Irwin RS, et al. Managing chronic cough as a symptom in children and management algorithms. CHEST. 2020;158:303–329.
- Morice AH, Millqvist E, Bieksiene K, et al. ERS guidelines on chronic cough in adults and children. Eur Respir J. 2020;55:1901136.
- Global Initiative for Asthma. Global Strategy for Asthma Management and Prevention. 2026.
- Global Initiative for Asthma. Summary Guide for Asthma Management and Prevention. 2026.
- ARIA-EAACI Guidelines 2024–2025. Intranasal treatments for allergic rhinitis.
- Kantar A, Chang AB, Shields MD, et al. Chronic cough in children: practical and clinical perspectives.
- ERS clinical practice guideline for management of children and adolescents with bronchiectasis. Eur Respir J. 2021;58:2002990.
- Royal Children's Hospital Melbourne. Clinical Practice Guideline: Cough. Updated clinical pathway.
- GINA 2026 and guideline source images used under their respective terms; generated photographs depict no real patient.

**Every child deserves a
future
with easier breaths.**

Healthier children. Brighter tomorrows.

