Chronic cough in preschool aged children

10-Minute Consultation

Chronic cough in pre-school aged children

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This is part of a series of occasional articles on common problems in primary care. *The BMJ* welcomes contributions from GPs

Box start

What you need to know

- Chronic cough in pre-school aged children is a common cause of concern for parents and caregivers, and has a substantial impact on quality of life for the whole family
- Assess whether the cough is dry or wet, and what triggers are present, to help determine the cause and whether further intervention is required
- For a well child with normal examination findings and no red flag features, no further investigations are required

Box end

A 20 month old boy is brought for review in general practice because his parents are concerned that he has had a persistent cough for nearly six months. Six weeks ago, he was diagnosed with a lower respiratory tract infection based on crepitations heard on auscultation. He was given a five day course of amoxicillin and his cough improved slightly, but only for a few days. A subsequent trial of inhaled salbutamol was ineffective. A week ago, he presented to the emergency department by ambulance as his parents were concerned about noisy breathing and cough. He was given dexamethasone for a clinical diagnosis of croup and discharged later that day.

His parents expect him to have frequent viral infections as he attends nursery, but report that the cough continues even when he is well. He is fully vaccinated, appears to be thriving, and is very active. His development is normal. On examination, he is coughing and appears coryzal. He is afebrile and chest examination is normal, apart from rattly transmitted upper airway sounds. He has had no investigations for his cough to date.

Cough is a common reason for pre-school children to be seen in primary or ambulatory care. Estimated prevalence ranges from 5% to 23% of all primary care encounters.[1] Although causes of cough are usually self-limiting, healthcare professionals need to consider and exclude potentially serious underlying conditions. This article outlines how to assess young children with chronic or recurrent episodes of cough and how to make evidence informed management plans with parents.

What you should cover

History

Ask about:

- The nature of the cough: is it wet or dry? The difference can be reliably identified by both clinicians and parents[2]
- Duration of symptoms
- Frequency of coughing
- Change over time, for example diurnal or seasonal variation
- Associated symptoms, such as stridor, wheeze, fever, nasal congestion, choking, or vomiting
- Birth and neonatal period, growth, developmental progress, and feeding history
- Recent exposure to family members or other contacts with symptoms, environmental factors (tobacco smoke, vaping, or aeroallergens), or known triggers
- Immunisation history
- Presence of any "red flag" features (table 1).

Table 1 Red flag features on history and examination and potential implications

Red flag	Potential implications or cause
Abnormal cry or voice	Laryngeal disorder
Faltering growth	Excessive energy requirements owing to underlying disease process
Family history of chronic lung diseases in childhood	Inherited lung disorder
Fatigue	Chronic disease, malignancy
Finger clubbing	Underlying lung disease, eg, bronchiectasis
Haemoptysis	Infection, foreign body, or vascular anomaly
Nasal polyps	Allergic rhinitis, cystic fibrosis
Onset of cough in the neonatal period	Congenital anomaly, inherited lung disorder
Recurrent coughing during feeds	Palate or laryngeal disorder, swallow incoordination
Sudden onset of severe cough	Inhalation of foreign body
Weight loss or new night sweats	Tuberculosis, malignancy

What you should do

Examination

- Observe the child's general appearance and document temperature.

- Assess heart rate and respiratory rate against age-appropriate values.
- Assess for cervical lymphadenopathy and finger clubbing.
- Inspect the nose for signs of congestion, discharge, or polyps.
- Assess for signs of acute or chronic increased work of breathing, such as intercostal or subcostal recession, tracheal tug, or chest shape changes such as Harrison's sulci.
- Listen to lung sounds and assess for asymmetric air entry, wheeze, or crackles.
- Consider percussion and vocal resonance if there is asymmetry of examination findings.
- Measure the child's weight and length or height, and plot on a growth chart in the child's health record.

Determining a cause

Infectious causes of acute cough in this age group are common, including viral or bacterial upper respiratory tract infection, bronchiolitis, and pneumonia. They are usually associated with typical features in the history and examination. In a systematic review of one randomised controlled trial and four observational studies reporting time to resolution of acute cough in children under 10, cough resolved in 50% of 828 children by day 10, and in 90% by day 25.[3]

A cough persisting for more than four weeks is considered chronic and should prompt consideration of potential underlying causes (table 2).[4] Although cough related to acute infection typically resolves within four weeks, post infectious cough can last considerably longer, for example after infection with respiratory syncytial virus, pertussis, or mycoplasma.[2] The cough is generally dry and improves gradually over time. Tuberculosis should be considered in countries where it is endemic or in groups at higher risk, for example asylum seekers and refugees.[5]

Protracted bacterial bronchitis is a common cause of chronic cough, characterised by an isolated wet or productive cough without signs of another cause, and which usually responds to two weeks' treatment with an appropriate antibiotic.[6 7] An Australian multicentre study across both community and hospital settings reported that 142 of 346 (41%) children newly referred for chronic cough had protracted bacterial bronchitis.[8] Children with protracted bacterial bronchitis may have crackles audible on auscultation but generally appear well, without systemic symptoms. Failure to improve with two weeks of antibiotics should prompt consideration of other diagnoses, such as bronchiectasis.

Recurrent cough describes two or more discrete episodes in a year, with recovery in between. Ask about potential triggers, for example, viral illnesses or exposure to environmental factors such as tobacco smoke, vaping, allergens, or pollutants.

While asthma is uncommon in pre-school children, it should be considered when a child has recurrent dry cough with or without wheeze, or when there are multiple triggers to episodes. Habitual cough often has an unusual character and disappears when the child is asleep.

Symptoms such as regurgitation and irritability related to feeding may suggest gastro-oesophageal reflux disease, although cough is an unusual presenting feature in children and infants.[9] If cough is temporally associated with feeds, consider the possibility of poor coordination of swallowing.

Table 2 Differential diagnoses of chronic cough

Diagnosis	Indicators
Protracted bacterial bronchitis	Chronic wet cough, systemically well
Post infectious cough	History of infection, dry cough, gradual improvement
Inhaled foreign body	Sudden onset of symptoms, unilateral chest signs
Environmental irritants or allergens	Exposure to tobacco smoke, vaping, aeroallergens, or pollutants; nasal congestion
Asthma	Recurrent episodes of dry cough, multiple triggers, change over time
Pertussis	Characteristic cough
Tuberculosis	Weight loss, recurrent fever, haemoptysis, malaise.
Bronchiectasis (including cystic fibrosis, primary ciliary dyskinesia)	Wet, productive cough; faltering growth
Recurrent aspiration	Coughing with feeds
Tracheo- or broncho-malacia/large airway compression	Chronic brassy or barking cough
Mediastinal neoplasm	Weight loss, recurrent fever

Management

In figure 1, we outline a proposed algorithm for management of chronic cough in pre-school aged children.

If the child is well, with normal examination findings and no red flag features, reassure the family that no further investigations are required.

- Recognise the significant anxiety and disruption to life that chronic cough can cause. Explain that no evidence suggests a benefit from taking antitussive or mucolytic agents for cough.[10 11]
- Provide safety net advice, for example to seek review if new symptoms appear. If the child is exposed to potential environmental factors contributing to cough, offer advice and signpost families to further information (for example, the Allergy UK website).
- Consider referral to smoking cessation services if indicated.
- Aim to provide continuity if follow-up attendance is required.

If protracted bacterial bronchitis is suspected, evidence from a systematic review of three randomised controlled trials suggests that the initial treatment of choice is a 14 day course of

antibiotics, with a number needed to treat for additional beneficial outcome of 3 (95% confidence interval 2 to 4).[12, 14]

- Oral amoxicillin and clavulanic acid in combination is often recommended, as commonly implicated pathogens such as *Haemophilus influenzae* may be resistant to amoxicillin alone.[7]
- Alternatively, a macrolide or trimethoprim-sulfamethoxazole may be used when a child has known penicillin hypersensitivity. Choice of antibiotic should reflect local sensitivity patterns, if known.

If asthma is suspected, for example when recurrent or chronic dry cough is associated with multiple triggers, consider an eight-week trial of low dose inhaled corticosteroids, such as beclomethasone[13]:

- Ensure good inhaler technique and review after eight weeks
- Discontinue inhaled steroids if no benefit is seen.

Parents commonly want to know when the cough will go away. Explain that chronic cough in well children usually improves over time, although this can take weeks rather than days, even where treatments are given for possible protracted bacterial bronchitis or asthma. Re-evaluation in person or remotely may be necessary to monitor progress, response to treatment, or to adjust management.

Fig 1 Proposed algorithm for management of chronic cough in children of pre-school age

When to refer

Consider chest radiograph and discussion with a specialist if chronic cough is associated with abnormal findings on examination or fails to improve with initial management. Consider referral to a specialist for further assessment if chronic cough is associated with red flag features. In our practice, we recommend referring children who have more than two episodes of protracted bacterial bronchitis in one year.

Box start

Resources and signposting

- Royal College of Paediatrics and Child Health. Cough/colds (over 1s). https://www.what0-18.nhs.uk/professionals/gp-primary-care-staff/safety-netting-documents-parents/coughcold-children-1-year-and-over-advice-sheet
- AllergyUK, Allergy resources. https://www.allergyuk.org/resources/
- American Thoracic Society. Patient Education Information Series. Protracted bacterial bronchitis (PBB) in children. https://www.thoracic.org/patients/patient-resources/resources/pbb-in-children.pdf

Box end

Box start

Education into practice

- Think about the last time you reviewed a pre-school aged child with chronic cough. Which red flag features did you assess for in the history and examination, and if none were identified, what information did you provide for the family?
- In your clinical practice, review repeat prescriptions for inhaled bronchodilators and inhaled steroids in pre-school aged children. Is there evidence of benefit or could a trial without treatment be considered?

Box end

Box start

How patients were involved in the creation of this article

When writing this article, we sought out the experiences of parents and carers of children with cough during assessment in primary care, and during first and follow-up appointments in secondary care. Specifically, the authors asked what most concerned families about their child's cough, what impact the cough had on the family, and what would have improved their experience of the consultation. They discussed what caregivers found helpful and how they felt they might be best supported, and revised the text accordingly. Families particularly wanted to know if, and how quickly, symptoms were likely to improve and what they should do if new symptoms appear.

Box end

Box start

How this article was created

This article drew on the experiences of children with chronic cough and their families, as described below. The authors discussed common patterns of presentation to primary and secondary care, and how best to identify patients that require further investigation or referral. Guidance from the National Institute for Health and Care Excellence was reviewed, and a literature search was undertaken using relevant MeSH terms and keywords including "cough", "chronic", "persistent", and "child, preschool".

Box end

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