

LRI Children's Hospital

Management of Chronic Cough in Children UHL Children's Medical Guideline

Staff relevant to:	Clinical staff within the UHL Children's Hospital
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1. Introduction and scope

Cough is a common presenting symptom in children. Chronic cough is variously defined as cough lasting for more than 4 weeks ⁽¹⁾ or 8 weeks ⁽²⁾ but for the purposes of this guidance, we have agreed upon the more recent European definition of **cough lasting more than 4 weeks**.

Chronic cough is common and can be a symptom of various diseases and the remit of this guidance is to provide a diagnostic pathway so that serious underlying diseases are not missed. This guideline will enable clinicians managing children with chronic cough to implement the initial diagnostic investigations and management strategies prior to referral for tertiary respiratory assessment.

This guideline is intended for use at Leicester children's hospital for paediatric chronic cough referrals from primary care or secondary care. This guideline can also be used as reference for regional district hospitals who refer to Leicester for tertiary paediatric respiratory assessment.

2. Background

- Cough is a non-specific symptom, more common in the pre-school age group over winter months
- Young children can develop 6-12 respiratory tract infections per year with a self-limiting cough < 4 weeks
- It is important to differentiate between recurrent episodes of acute cough with periods of no cough in between versus a persistent, non-remitting cough with no interval improvement
- A daily productive cough is abnormal in children and usually has an identifiable cause which requires further assessment
- A dry cough can have various aetiologies. DO NOT make a diagnosis of asthma unless proven by objective measurements.

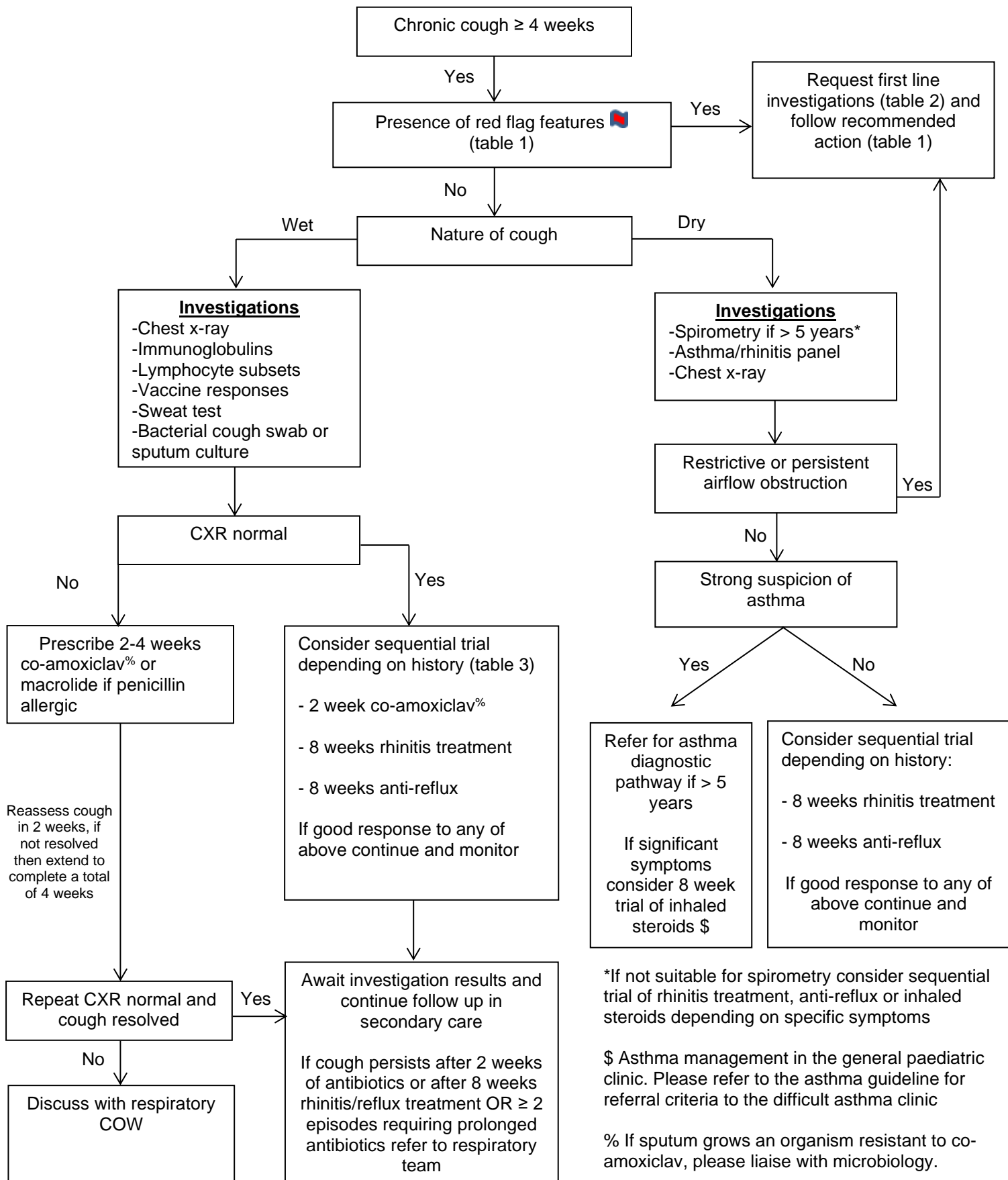
3. Assessment

- Full history including screening for red flag features (Table 1)
- Physical examination inclusive of cardiorespiratory, ENT and growth check. Exclude red flag clinical signs (Table 1)
- Identify symptoms and signs of specific disease
- Determine if wet versus dry cough – ask the child to huff and cough

Table 1 Red flag features indicating need for further evaluation

Red flag clinical features 	Possible implication	Action
Restriction (FVC below lower limit of normal) or persistent airflow obstruction (FEV1 < 70%, z-score < -1.96)	Restrictive lung disease or BO	Outpatient referral letter to general respiratory
Neonatal onset cough	PCD, congenital airway disorders	Outpatient referral letter to general respiratory
Choking episode at cough onset	Foreign body	Same day referral to ENT
Chokes/coughs/gags with feeds	Unsafe swallow, recurrent aspiration	Refer to SALT
Neonatal onset nasal discharge	PCD	Outpatient referral letter to general respiratory
GIT symptoms e.g. malabsorption, meconium ileus, steatorrhea	CF	Sweat test and ≥ 30 mmol refer to respiratory
Other site infections or atypical	Primary immunodeficiency	Do baseline immunology and discuss with immunology
>1 severe respiratory illness needing HDU/ITU	Immunodeficiency, airway malacia, post infective sequelae	Outpatient referral letter to general respiratory
Recurrent haemoptysis	Various aetiology ⁽³⁾	Discuss with respiratory COW
Chronic cough & faltering growth	CF, immunodeficiency, any chronic disease	Baseline investigations and outpatient referral letter to general respiratory
Digital clubbing	Various respiratory and non-respiratory causes	Baseline investigations and outpatient referral letter to general respiratory
Persistent crackles and/or wheeze in the absence of acute infection	Bronchiectasis, ILD	Baseline investigations and outpatient referral letter to general respiratory
Nasal polyps	CF or PCD if no clear allergic cause	Baseline investigations and outpatient referral letter to general respiratory
Persistent chest x-ray changes following diagnostic algorithm in section 4	Bronchiectasis	Discuss with respiratory COW

4. Approach to child with chronic cough



5. Investigations

Please do not refer for tertiary assessment until first line investigations are completed as per section 4.

Table 2 First Line Investigations

Investigation	Details
Chest x-ray	To assess and monitor parenchymal change
FBC & lymphocyte subsets	If abnormal consider repeat and immunology advice PaedsImmunology@uh-tr.nhs.uk See also PID guideline ⁽⁴⁾
Functional antibody responses to H. influenzae and pneumococcal serotypes (IgG)	If low titres in fully immunised child arrange booster vaccine and repeat IgG in 4-6 weeks. If repeat low to consider immunology advice as detailed above ⁽⁴⁾ Note – pneumococcal positive serotypes for ≥ 8 serotypes is normal.
Immunoglobulins	If abnormal seek immunology advice as detailed above ⁽⁴⁾
Sweat test	Request sweat chloride via ICE and email SweatTest@uhl-tr.nhs.uk Sweat chloride < 30 mmol/L normal Sweat chloride 30-60 mmol/L needs repeat Sweat chloride ≥60 mmol/L refer to CF team
Sputum	Send for MC&S and extended virology panel Consider sputum for TB and TB clinic referral if suspected ⁽⁵⁾
Asthma rhinitis panel	Send bloods for FBC, vitamin D, ferritin, Total IgE and specific IgE for house dust mite, moulds, animal dander, pollens to assess sensitisation
Spirometry and bronchodilator reversibility	Request via ICE (service requests>paediatric physiology tab) Assess for obstructive vs restrictive spirometry Bronchodilator reversibility ≥ 12% is consistent with asthma diagnosis Note - a normal spirometry and bronchodilator response does not always exclude asthma ⁽⁶⁾

UHL Practice Point:

Referrals without first line investigations will not be accepted. Please list investigations completed in referral letter.

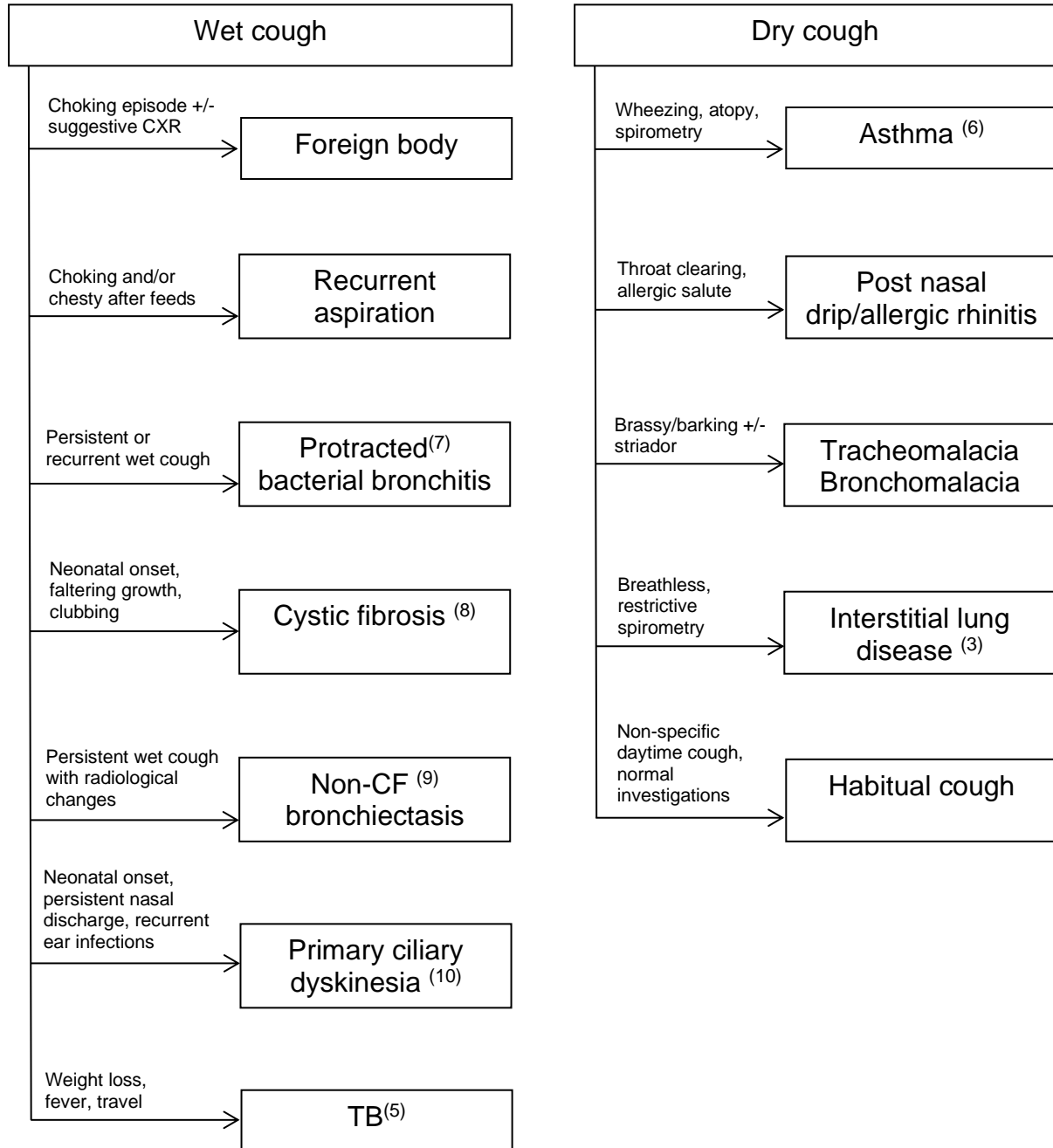
Second Line Investigations

Second line investigations should be requested following review by a tertiary respiratory consultant. These investigations are indicated if symptoms persist after initial management. Examples and possible indications of second line investigations are outlined below:

- **pH and/or impedance study:** exclude gastro-oesophageal reflux. Can be done at same time via children's daycare.
- **Flexible bronchoscopy and bronchoalveolar lavage (BAL):** assess airway anatomy, exclude tracheobronchomalacia or pits suggestive of H-type TOF. BAL samples for microbiology and cytology. Joint airway assessment with ENT can be carried out if suspicion of upper airway involvement.
- **CT chest:** ideally in inspiratory and expiratory phase to exclude bronchiectasis, bronchiolitis obliterans, interstitial lung disease and congenital pulmonary malformations. Contrast enhanced CT scans are preferred for suspected airway malacia or suspected cardiac disease. Virtual CT bronchograms can be carried out if clinically indicated to further assess tracheobronchomalacia and opening pressures.
- **Safe swallow assessment:** Speech and language team assessment can be requested in the community. Video fluoroscopy can be considered if there are concerns about silent aspiration, titration of thickeners and/or clinical uncertainty. This is arranged by SALT team. If clinical suspicion of recurrent aspiration secondary to anatomical problems (e.g. laryngeal cleft) refer to ENT.
- **Extended immunology screen:** following discussion with immunology team if unusual and atypical clinical, baseline immunological and/or microbiological findings.
- **PCD diagnostics:** Testing is undertaken as part of the national PCD diagnostic centre at Leicester. Referral letters to be sent to kellychamberlain@nhs.net.

6. Differential diagnoses

The history and physical examination should be sufficient to form a differential diagnosis which could include:



7. Management

A guide to initial management has been highlighted in section 4. Please see table 3 for a summary of generic and more specific therapies that can be initiated.

Table 3 Summary of management strategies in chronic cough

Non-pharmaceutical management	
Specific management	Examples
Exposure to tobacco smoke	Education, smoking cessation advice ⁽¹¹⁾
Allergen avoidance	House dust mite, animals
Immunisations	Primary immunisation & seasonal flu +/- covid
Adherence	Prescription pick up rate
Lifestyle changes	Diet and exercise. Vitamin D
Pharmaceutical management	
Specific management	Examples
Prolonged antibiotic course ⁽¹⁾	First line: co-amoxiclav 2 weeks (cBNF) Second line or penicillin allergic e.g. clarithromycin for 2 weeks (cBNF) or azithromycin 10mg/kg OD for 10 days
Rhinitis treatment	Antihistamine: cetirizine or fexofenadine (cBNF) Nasal corticosteroids e.g. Avamys
Anti-reflux	Lansoprazole (+/- gaviscon)
Inhaled corticosteroids ⁽¹²⁾	Beclomethasone (cBNF and asthma guidance) Ensure inhaler technique, spacer & action plan
Vitamin D and iron deficiency	May need treatment course vitamin D and iron

UHL practice point:

Consider appropriate referral (Allergy clinic, asthma service, tertiary respiratory clinic, ENT clinic) if therapeutic trials above are not successful.

8. Education and Training

None

9. Monitoring Compliance

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
1. Red flag symptoms appropriately picked up? 2. Followed the appropriate decision tree for the patient 3. Investigations are done appropriately and in a timely manner 4. Appropriate follow-up arranged	Audit of children referred to UHL with chronic cough	Dr Deepa Patel Dr Manisha Ramphul	Once in 2-3 years	At departmental audit meeting. Systemic risks or lack of resources on monitoring audit will be reported at board level.

8. Supporting Documents and Key References

1. Kantar A et al. ERS statement on protracted bacterial bronchitis in children. Eur Respir J 2017; 50: 1602139
2. Shields MD et al. Recommendations for the assessment and management of cough in children. Thorax 2008; 63: 3, doi:10.1136
3. Ernst E and Midulla F. ERS Handbook of Paediatric Respiratory Medicine. Second edition, 2021.
4. Investigating Suspected Primary Immunodeficiency UHL Children's Medical Guideline
5. Tuberculosis UHL Children's Hospital Guideline
6. NICE asthma guideline: <https://www.nice.org.uk/guidance/ng80>
7. Gilchrist FJ. An approach to the child with a wet cough. Paed respiratory reviews 2019 75-81
8. Cystic Fibrosis UHL Children's Hospital Guideline
9. Chang *et al.* European Respiratory Society guidelines for the management of children and adolescents with bronchiectasis, ERJ 2021.

9. Key Words

Children, Respiratory, Chronic cough, wet cough, chesty cough, dry cough, Airway, Asthma, Spirometry, protracted bacterial bronchitis, bronchiectasis.

The Trust recognises the diversity of the local community it serves. Our aim therefore is to provide a safe environment free from discrimination and treat all individuals fairly with dignity and appropriately according to their needs.

As part of its development, this policy and its impact on equality have been reviewed and no detriment was identified.

CONTACT AND REVIEW DETAILS	
Guideline Lead (Name and Title) Deepa Patel - Consultant	Executive Lead Chief Medical Officer
Details of Changes made during review: Complete revision of previous guideline (re-written) from July 2021 v1.1	