

Cough – 'A cough that just won't go away – here is what you need to know'



Dr Stefan Unger PhD DTM&H MRCPCH

Consultant Respiratory Paediatrician

NHS Research Scotland (NRS) Clinician

Chair ERS Paediatric Respiratory Infection and Immunology Group



Disclosures

- None

- Cough mechanism
- Cough types
- How common is it?
- Outcome of cough
- History and examination
- Initial management
- What next?

What is Cough?

A cough is a natural defence mechanism that helps your body get rid of irritants in your throat or airways. The cough mechanism involves several phases.

Receptorial phase

- Cough receptors are stimulated and send a signal to the brain through the vagus nerve.

Inspiratory phase

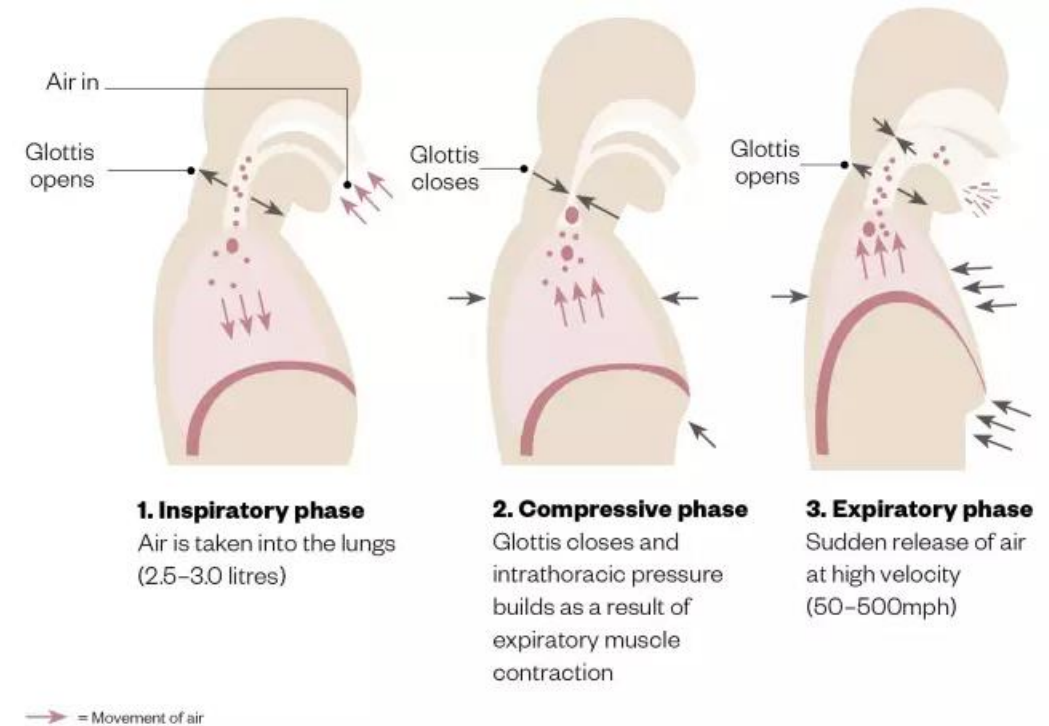
- The glottis opens, and you inhale rapidly. This creates the volume needed for a cough.

Compression phase

- The glottis closes, and the muscles in your chest wall, diaphragm, and abdomen contract. This creates a rapid increase in pressure in your chest cavity.

Expiratory phase

- The glottis opens, and the muscles in your chest and abdomen push air out of your lungs. This creates high airflow and a coughing sound. The high airflow helps dislodge mucus from your airways.



Types of cough presentations

Length

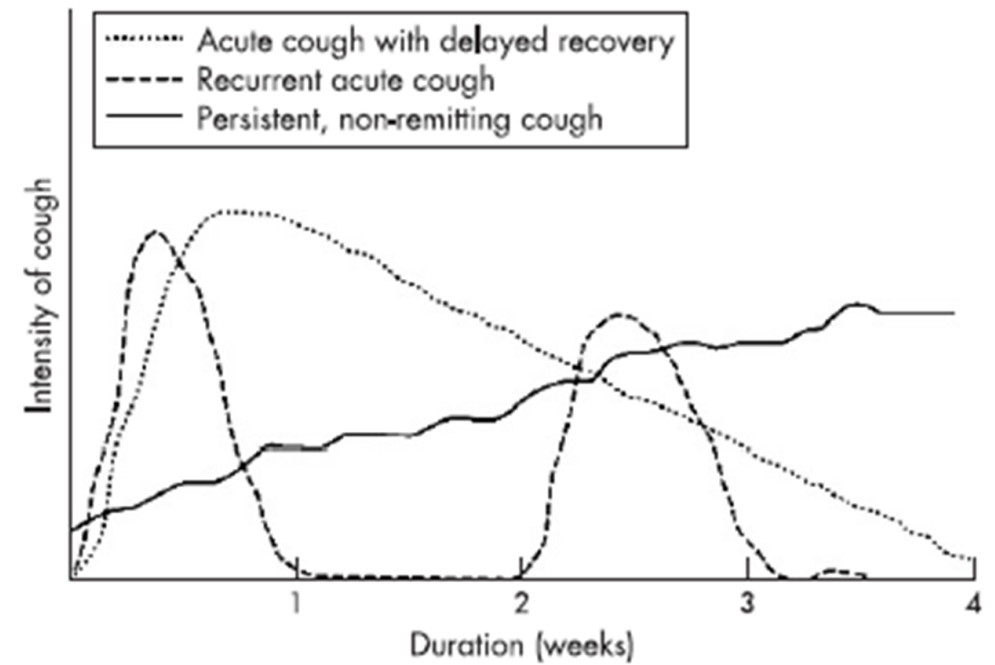
Acute cough - <4 weeks

Prolonged acute cough – 4-8 weeks

Recurrent (intermittent) cough

Chronic cough - >8 weeks

Characteristic



Types of cough presentations

Length

Acute cough - <4 weeks

Prolonged acute cough – 4-8 weeks

Recurrent (intermittent) cough

Chronic cough - >8 weeks

Characteristic

Dry

Wet

Mixed

Barking / others

Cough characteristic and associated features	Consider
Wheeze, nocturnal, dry	Asthma
Wet/productive	Cystic fibrosis (CF), Primary ciliary dyskinesia (PCD), bronchiectasis, Protracted Bacterial Bronchitis (PBB), immune deficiency
Paroxysms and whoop	Pertussis
Throaty/clearing	Post-nasal drip/rhinitis
Choking/vomiting	Recurrent aspiration
Brassy/barking	Airway compression
Never present during sleep	Psychogenic/habit
Dry/breathless +/- crackles	Interstitial lung disease
Weight loss, progressive	TB
Other conditions: tracheo-oesophageal fistula, inhaled foreign body, congenital lung anomaly, neuromuscular /neurodevelopmental disorder	

Types of cough presentations

Length

Acute cough - <4 weeks

Prolonged acute cough – 4-8 weeks

Recurrent (intermittent) cough

Chronic cough - >8 weeks

Characteristic

Dry

Wet

Mixed

Presentation to in primary care

What is the prevalence of the symptom cough in children consulting primary care physicians?

5 – 23% of GP consultations

Natural history of cough

50% recover by 10 days and 90% by 25 days, so 10% still have problems in the third to fourth weeks.

Journey into paediatric respiratory services

Chronic wet cough – 30%



Chronic dry cough – 25%



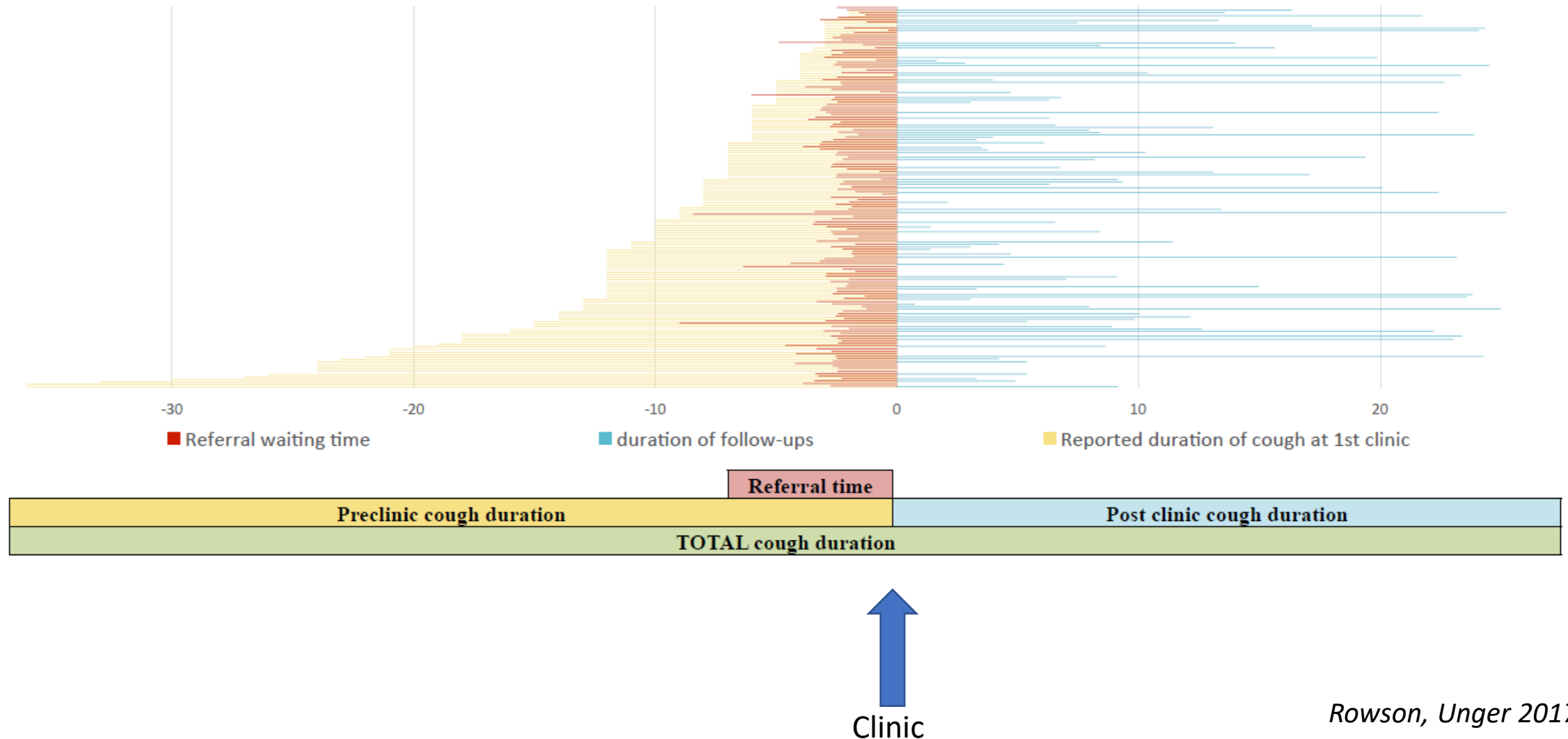
Episodic cough – 10%



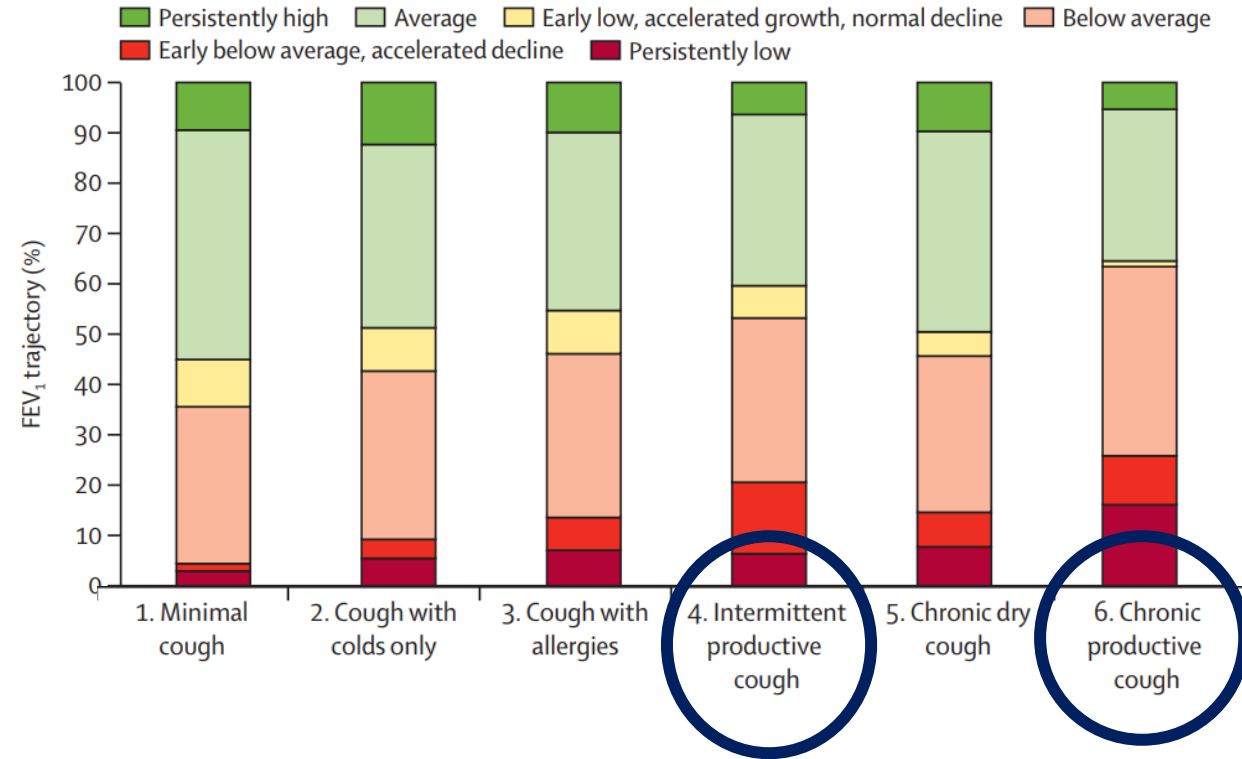
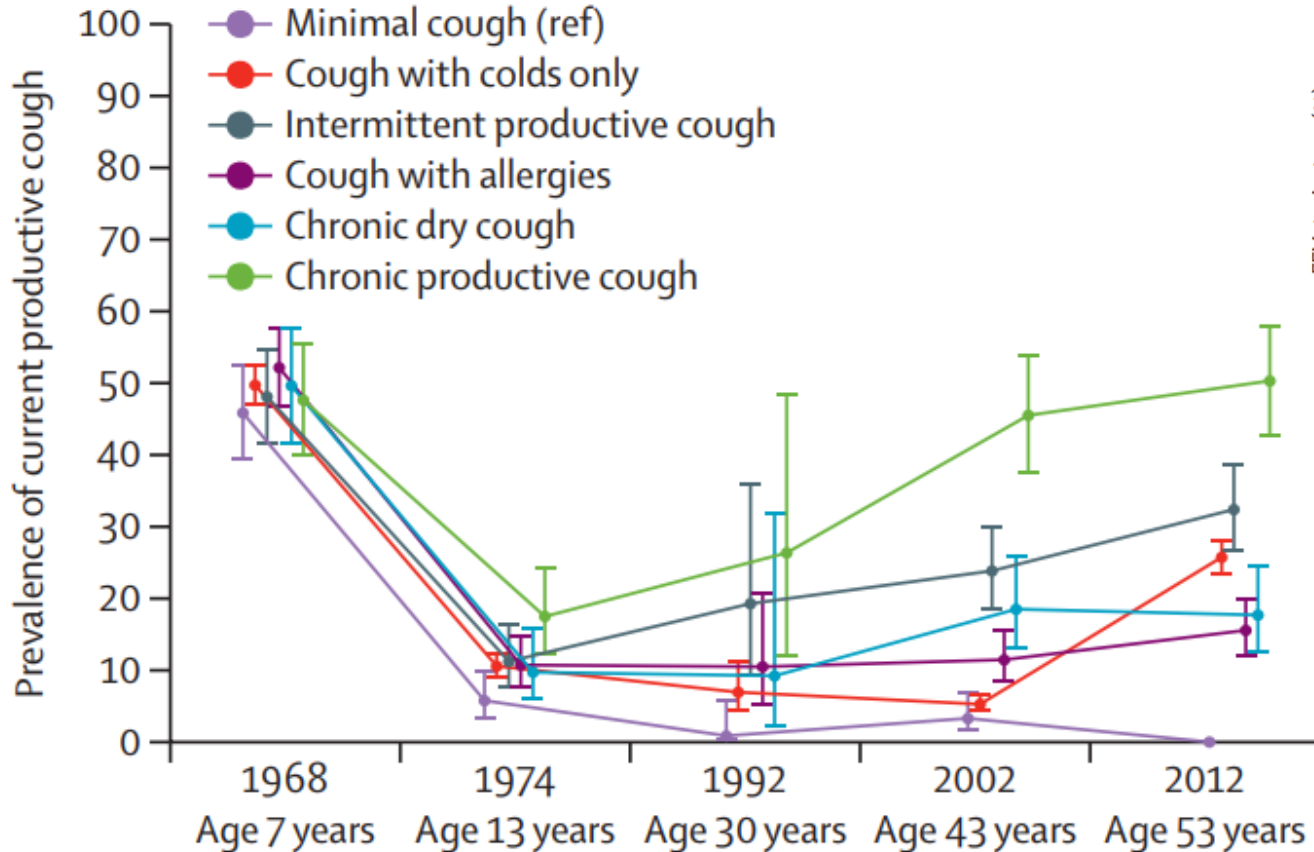
30-40% end up having some underlying condition

Outcome

- No cause of cough was found in 32%
- In 75% of children cough resolved by 24 months (by 26 and 20 months in those with and without a diagnosis respectively)

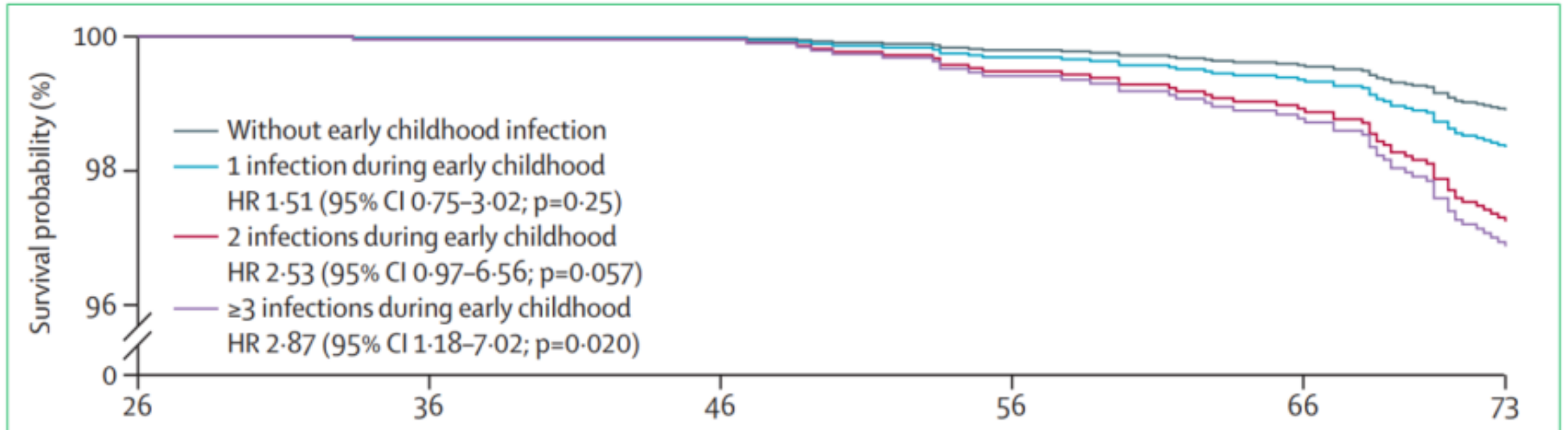


What about longer term?



- Cough may persist for years
- Those with wet cough (persistent or intermittent) at higher risk of poorer lung function

Early life health matters



Repeated early life respiratory infections may lead to earlier death

Survival probabilities by age 26-73 years according to number of lower respiratory tract infections in early life.



Acute infections

Protracted Bacterial
Bronchitis (PBB)

Chronic Suppurative
Lung Disease (CSLD)

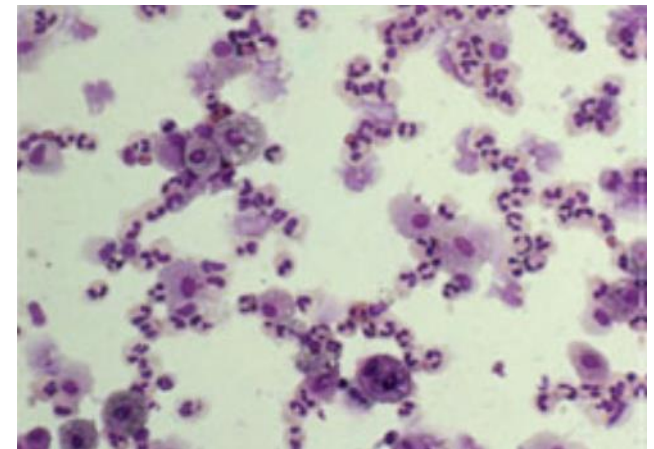
Bronchiectasis

Chronic wet cough



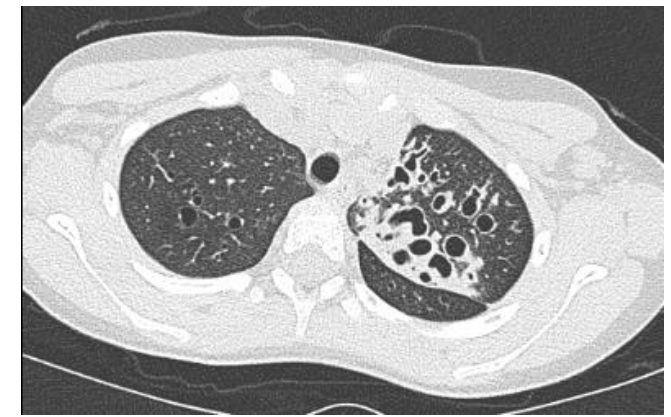
Definitions

- Chronic cough
 - ≥ 4 weeks (some centres argue ≥ 8 weeks)
- Protracted Bacterial Bronchitis (PBB)
 - Presence of continuous, chronic (>4 -weeks duration) wet or productive cough
 - Absence of symptoms or signs (i.e. specific cough pointers) suggestive of other causes of wet or productive cough
 - Cough resolved following a 2-week course of an appropriate oral antibiotic.
 - Recurrent PBB defined as >3 PBB episodes within 12-months.
- Chronic suppurative lung disease (CSLD)
 - Characterised by persistent/recurrent moist cough
 - Common themes:
 - Persistent and recurrent infection,
 - Neutrophilic inflammation,
 - Poor clearance of infected material

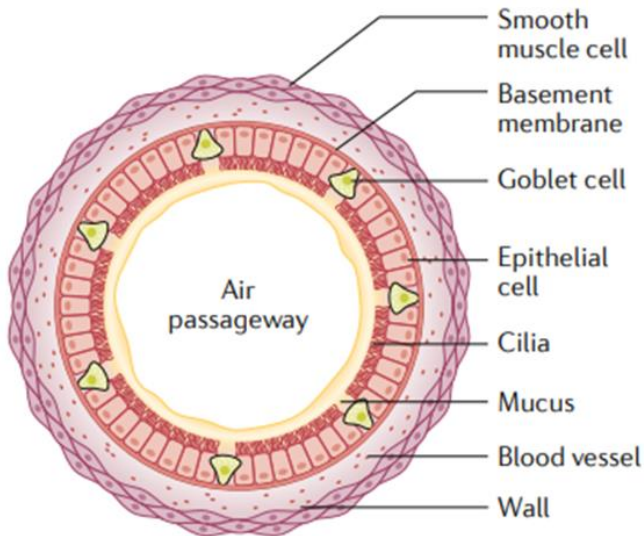


Bronchiectasis

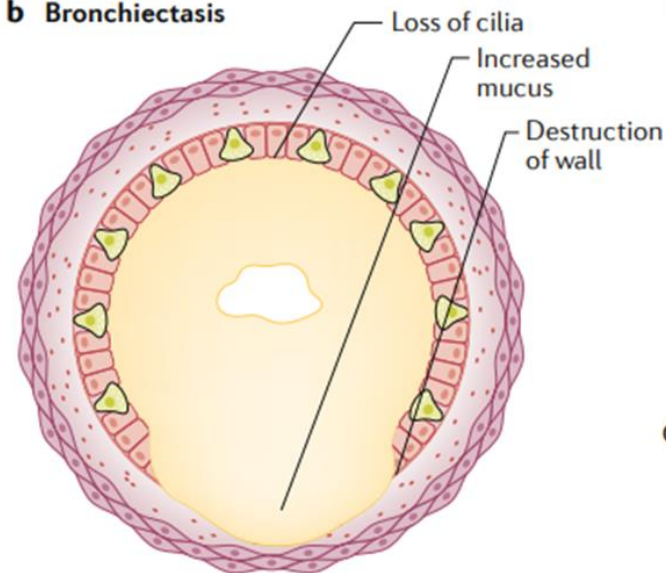
Described in early 1800
“Irreversible stretching of the windpipe”



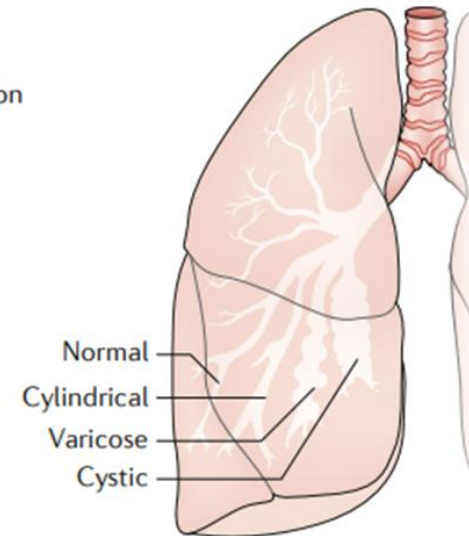
a Normal bronchus



b Bronchiectasis



c



- Airway dilatation
- Obstruction of airway with mucus
- Increased number and size of mucous glands (goblet cells)
- Bronchial wall damage
- Loss of cilia

Features present on HRCT include:

- *Bronchial airway dilation and lack of tapering*
- *Bronchial wall thickening*


Management of cough

Chronic cough > 4-8 weeks WITHOUT intermittent periods of being cough-free





➤ Remember: Pre-school children may experience recurrent acute cough.

Look for cough pointers

- Signify identifiable cause or more severe illness

Detailed history, checking for nature of the cough, cough pointers and  red flags

Wet/productive, mixed wet/dry OR chronic dry cough?

 History of inhaled foreign body	Failure to thrive	Exposure to airborne irritants (smoke)
 Chest pain	Recurrent otitis media/sinus disease/discharge	Chest tightness/ Wheeze
 Cough associated with swallowing	Family history	Breathlessness
 Haemoptysis	Less than 1 year old	GORD
Immunodeficiency	Sputum colour	Feeding difficulties
Cardiac abnormalities	Recurrent pneumonia	Exposure to Tuberculosis
Neurodevelopmental abnormalities	Lack of vaccinations	

Management of cough

Clinical examination of throat, chest, ear, checking for cough pointers

▶ cyanosis , ▶ respiratory distress, RR, digital clubbing, eczema, nasal crease, chest wall deformities, Harrison sulci, crackles, wheeze

▶ **RED FLAGS** present in the history or examination?

Stridor

Abrupt onset (inhalation of foreign body)

Cough with feeding

Haemoptysis

Neonatal onset

Signs of chronic lung disease

Dyspnoea

Cyanosis

Continuous unremitting or worsening cough

Night sweats

Weight loss

YES, red flags:

Requires specialist paediatric respiratory discussion/urgent referral/A&E.

Are there specific cough pointers present?
Is there a concern in the history or examination?

Yes?
Treat accordingly
Consider specialist referral

No? Is it a dry or a wet/mixed cough?

Management of cough

WET

WET or mixed wet/dry cough with other causes, acute infection or severe illness excluded

Is the trajectory towards improvement?

- YES, Isolated wet cough with no specific cough pointers and no red flags? It is reasonable to watch and wait for up to 8 weeks. Most coughing in children is related to transient infections.
- Consider treatment with 5/7 Amoxicillin if they have not already had a treatment course

If cough >8 weeks from onset and unresolved

- Have any pointers or red flags emerged?
- Has the child had any well periods – if so observe.
- If no red flags/points and no well periods consider a diagnosis of Protracted Bacterial Bronchitis (PBB).

Treat with broad spectrum antibiotic for 2 weeks
Co-amoxiclav or Clarithromycin

Book a review appointment in
6 – 8 weeks

Management of cough

WET

Resolved?

PBB

Advise to return if recurrence
Consider referral if
2nd episode chronic wet cough or 3+
episodes in older

Unresolved?

Respiratory referral/discussion
Consideration of CXR

Management of cough

DRY

Paediatric chronic dry cough >4 weeks

Detailed history & examination

If there are no specific cough pointers and no red flags it is reasonable to watch and wait for up to 8 weeks when the trajectory suggests improvement. Most coughing in children is related to transient infections.

Check for irritants (eg. Exposure to tobacco smoke, pet dander) and for signs of atopy
Consider precedent infection: observe, cough receptor hypersensitivity can occur after upper respiratory tract infection
Dry coughing suggests airway irritation and or inflammation

Dry cough lasting > 8 weeks from onset

- What is the trajectory
 - Have any pointers or red flags emerged?
- Investigate/treat/refer accordingly
- Has the child, in fact, had well periods within the 8 weeks? If yes, reassure, consider observation (4-8/52)

Pointers/atopy/irritants: Investigate/treat accordingly eg antihistamines and intranasal steroids
Remove aero-irritant exposures
eg environmental tobacco smoke
Consider specialist paediatric referral.
Consider continuing pathway.

Management of cough

DRY

Towards spontaneous regression?

- Reassure
- Follow up until complete spontaneous resolution

Persistent isolated cough, child otherwise well

A subset of children benefit from treatment with ICS

1. Consider getting a baseline cough score eg. score out of 10
2. 8 week trial of paediatric moderate dose* inhaled corticosteroid
e.g. 200mcg Beclomethasone twice a day (2-16 years)
100mcg Beclomethasone twice a day (<2 years)
3. Book a review appointment for 8 weeks

DRY

Cough resolved at 12 week review?

1. **STOP** inhaled corticosteroid
2. Review in 4 weeks for recurrence

Resolution sustained?
Advise to return if there is recurrence of chronic cough

Dry cough returned?

1. Age permitting (>5), test for asthma; airway obstruction/airway variability
2. Restart ICS at a **paediatric low dose** as first-line maintenance therapy and check for second response*
Seek advice if <2 years
3. Cautious and provisional diagnosis of cough on the asthma spectrum and follow asthma guidelines
4. Consider antihistamines & intranasal steroids for children with an allergic cough in the pollen season
5. Revisit asthma diagnosis regularly; unlikely in the absence of wheeze

Dry cough persistent?

[check adherence]

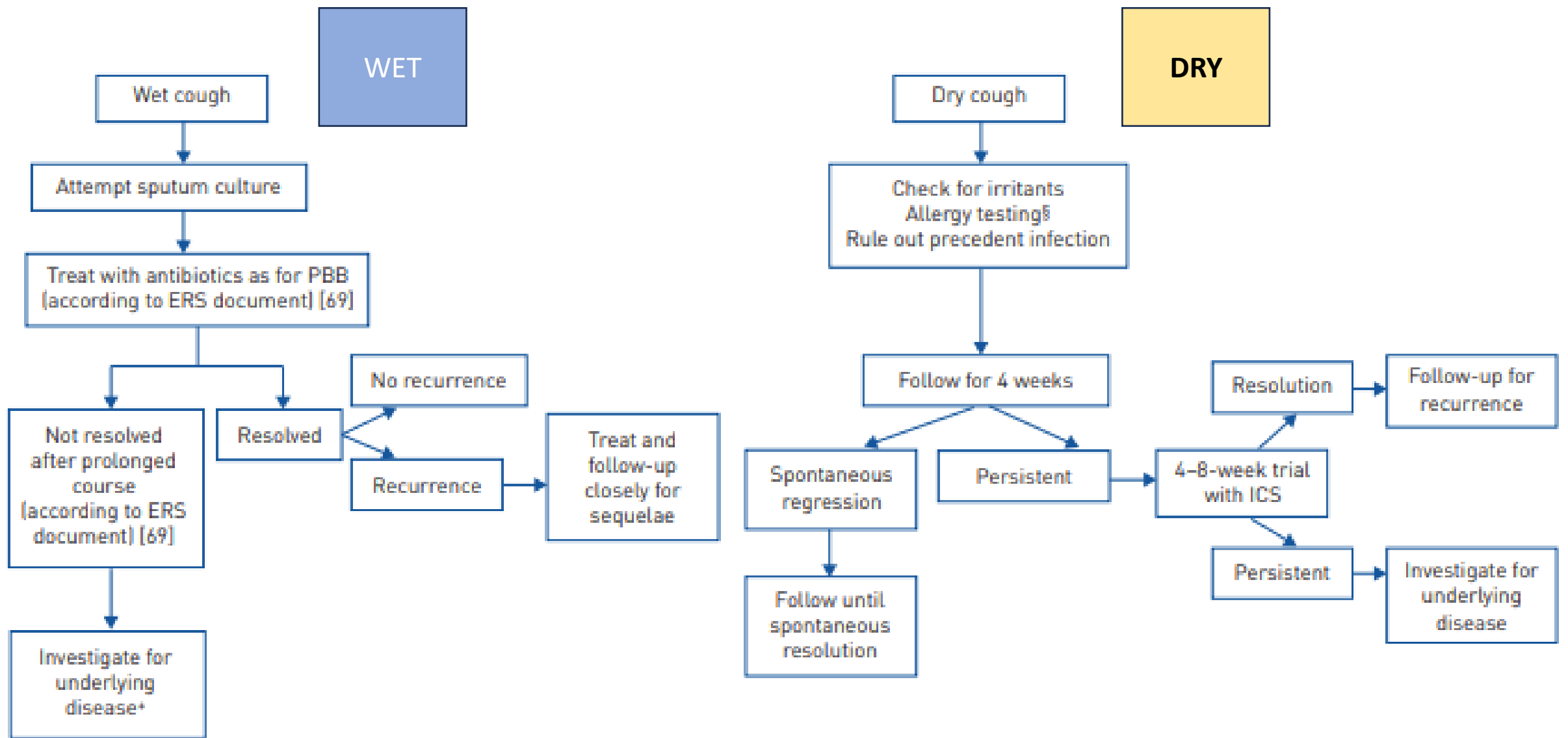
1. **STOP** inhaled corticosteroid and Refer

Refer:

- Requires specialist respiratory discussion/referral
- And request chest X-ray
- Consider trial of allergic rhinitis treatment or GORD treatment parallel to referral

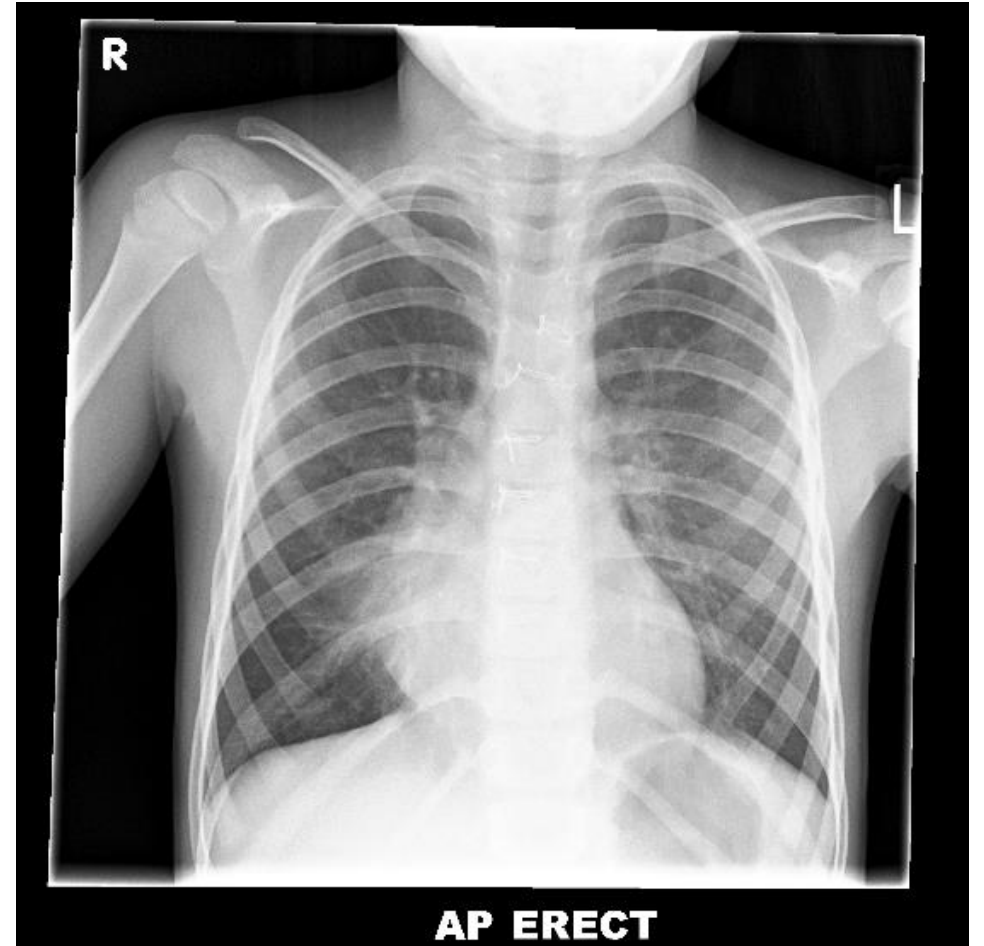
See also Paediatric Asthma RefHelp

Advice can be given if unsure:
Email RHCYP Asthma Nurses



Chest X-ray

- Good basic screening test - sensitive
- Poor specificity
- Poor indication of chronicity (unless repeated)



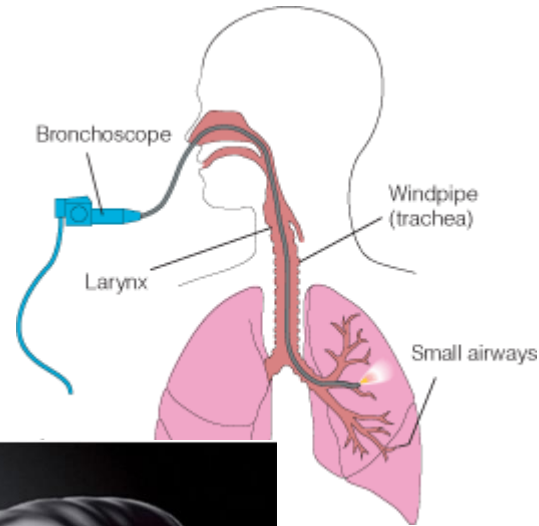
Pathway for investigating chronic cough

- Microbiology - cough swab or sputum
- Immune screen:
 - Full blood count, immunoglobulins (A,G,M, E), vaccine responses,
 - Sweat test
 - Consideration genetic test
- Aeroallergen screen
- Flexible bronchoscopy
- pH/impedance study
- CT chest

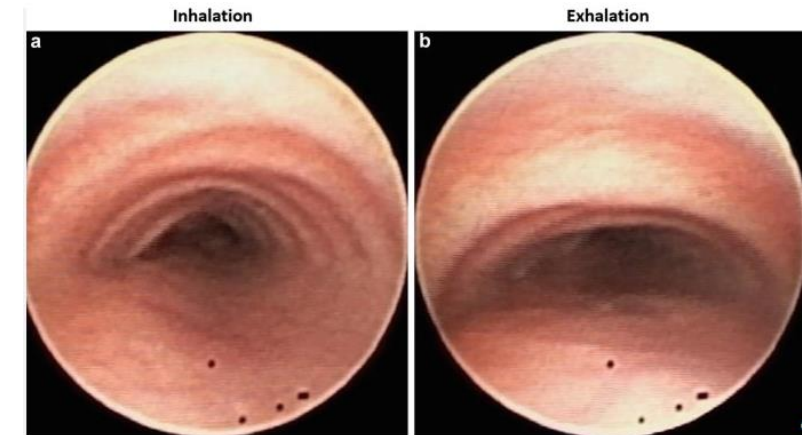


Pathway for investigating chronic cough

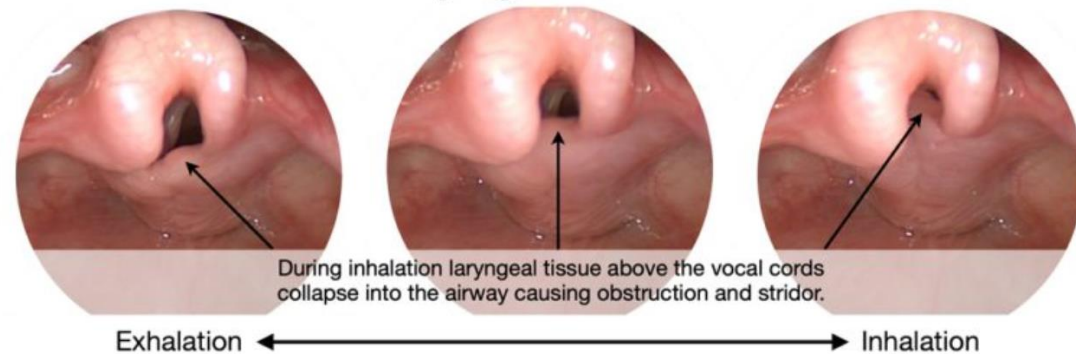
- Microbiology - cough swab or sputum
- Immune screen:
 - Full blood count, immunoglobulins (A,G,M, E), vaccine responses,
 - Sweat test
 - Consideration genetic test
- Aeroallergen screen
- Flexible bronchoscopy
- pH/impedance study
- CT chest



Tracheomalacia

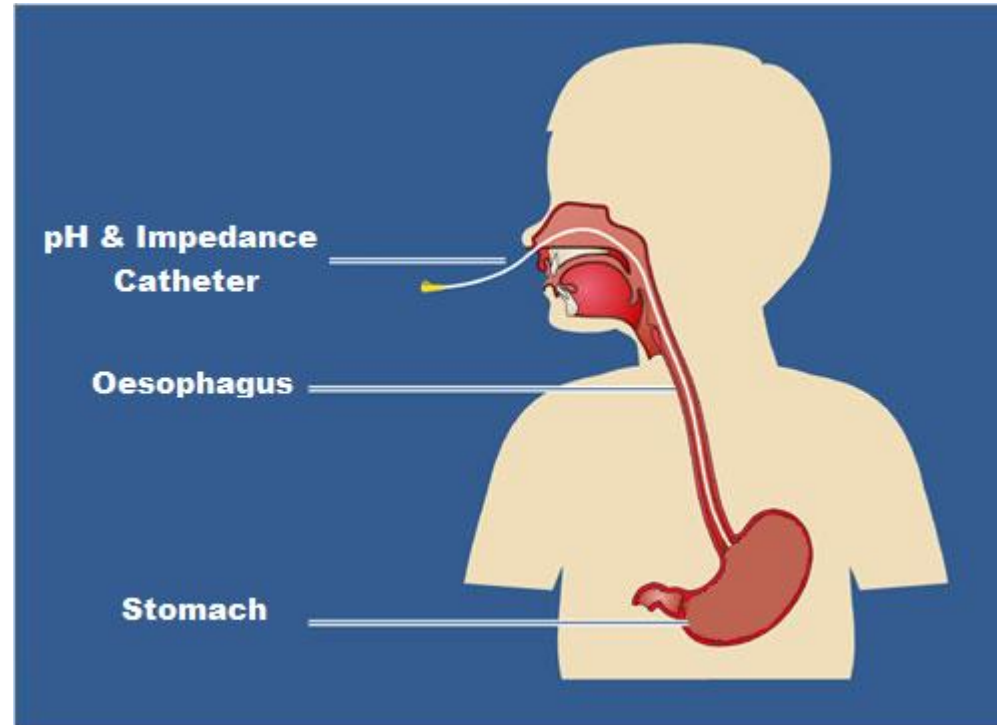


Laryngomalacia



Pathway for investigating chronic cough

- Microbiology - cough swab or sputum
- Immune screen:
 - Full blood count, immunoglobulins (A,G,M, E), vaccine responses,
 - Sweat test
 - Consideration genetic test
- Aeroallergen screen
- Flexible bronchoscopy
- pH/impedance study
- CT chest



Pathway for investigating chronic cough

- Microbiology - cough swab or sputum
- Immune screen:
 - Full blood count, immunoglobulins (A,G,M, E), vaccine responses,
 - Sweat test
 - Consideration genetic test
- Aeroallergen screen
- Flexible bronchoscopy
- pH/impedance study
- CT chest
- Other:
 - Lung function
 - Exhaled NO checking for airway inflammation
 - Nasal NO – screening test for primary ciliary dyskinesia (PCD)



Summary



- Cough is good
- Persistent cough is not good
- History and examination are key – red flags / cough pointers
- Pragmatic approach dependent on cough characteristics – Is it wet/dry? Is it continuous or intermittent?
- Early intervention and review
- Referral for those not settling or concerning features
- Structured investigation approach

Questions?

Contact:

stefan.unger@nhs.scot

respiratorysecretaries@nhs.scot

Complex Respiratory and Respiratory
Infection (COMRRI) Team

- Re-instate within NHS Lothian
- Direct contact for families and primary care

