

# Child with Chronic cough : Evaluation and Management

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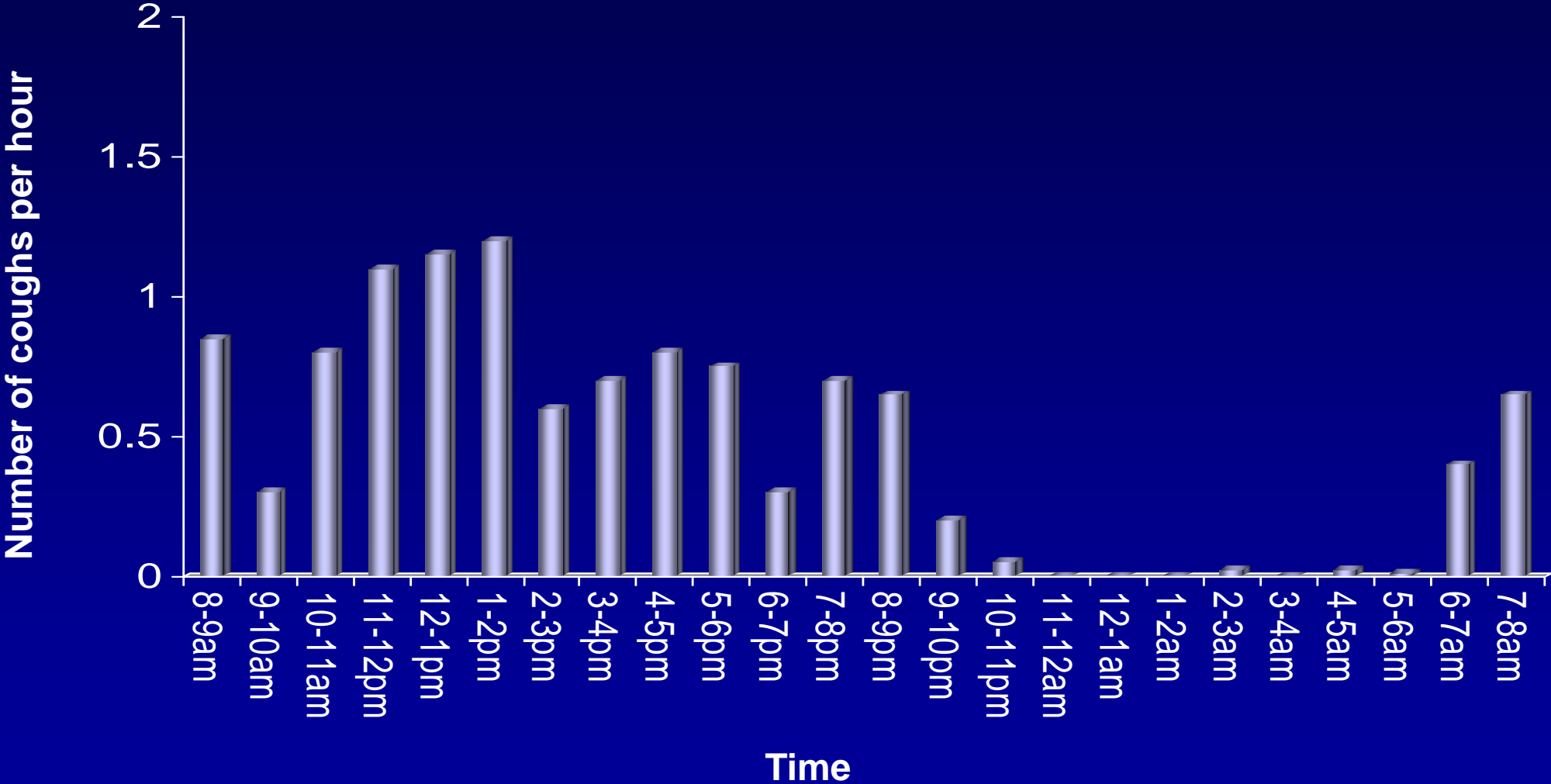
## Definition

- Acute cough is cough lasting for a maximum of 3 weeks
- Chronic cough is a daily cough of >4 weeks duration

## How much coughing is 'normal'?

- 41 normal children aged 8-12yrs were recorded with a multi-parametric device for 24 hrs
- Inclusion criteria:
  - No respiratory infections for 1 month
  - Normal physical examination
  - Normal spirometry

# Mean number of cough episodes/ hour



Munyard P, Bush A. Arch Dis Child 1996;74:531-4

## Results

- Mean number of cough episodes: 11.3/24hrs (Range:1-34)
- 2 children had nocturnal cough
- 5 had prolonged bouts of cough
- Cough was unaffected by passive smoking or presence of furry pets at home

# Duration of acute cough in pre-school children in primary care setting

- Prospective study of 0-4yr old children presenting with cough  $\leq 28$  days without asthma
- Findings
  - 50% recovered at 10 days and 90% at 25 days
  - Cough was associated with fever, breathlessness, disrupted sleep and reduced activity in a large number of children
- Conclusion
  - Acute cough from a URTI is not a trivial illness and 10% are still coughing at 4 weeks

# Chronic cough in children

- Chronic cough is a common cause for frequent medical consultations
- In a 1 year study on chronic cough (190 children, mean age 2.6 yrs)
  - >80% of children had  $\geq 5$  doctor visits
  - 53% of children had >10 doctor visits
- Burden of cough is high resulting in billions of dollars spent on over-the-counter cough medications
- It has a negative impact on schooling and sleep and reduces quality of life of the children and their parents

*Marchant JM et al. Chest 2008;134:303-9*

*Newcombe PA et al. Thorax 2010;65(9):819-23*

*Shields MD et al. Paediatr Respir Rev 2013;14(2):100-6*

# Causes of chronic cough in children

- In the older children (Asilsoy and Khosoo studies), the commonest etiologies were asthma, gastroesophageal reflux and upper airway cough syndrome
- In the younger children (Marchant and Chang studies), protracted bacterial bronchitis was the commonest diagnosis

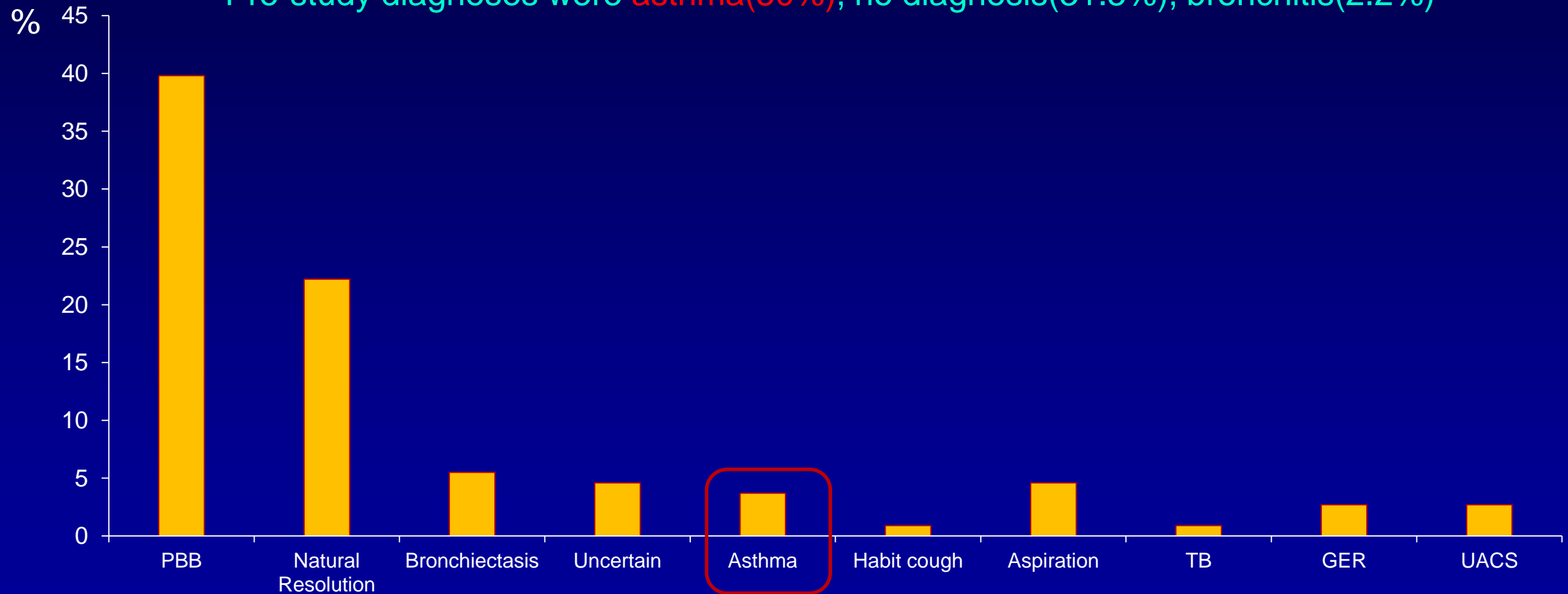
	PBB	Asthma	UACS	GER	Bronchiectasis	Tracheo- malacia	Habitual psychogenic cough	Spontaneous resolution	Other
<b>Marchant 2006</b> Mean age 2.6 yrs	40%	4%	3%	3%	6%	-	1%	22%	21%
<b>Asilsoy 2008</b> Mean age 8.4 yrs	23%	25%	20%	5%	3%	-	4%	6%	3%
<b>Khosoo 2009</b> Mean age 7.8 yrs	-	13%	43%	28%	-	-	10%	-	6%
<b>Chang 2012</b> Mean age 4.5 yrs	41%	15.8%	1.4%	2.3%	9%	6.1%	4.3%	13.9%	6.1%



# Outcome of children presenting with chronic cough

108 children (median age 2.6yrs) with chronic cough

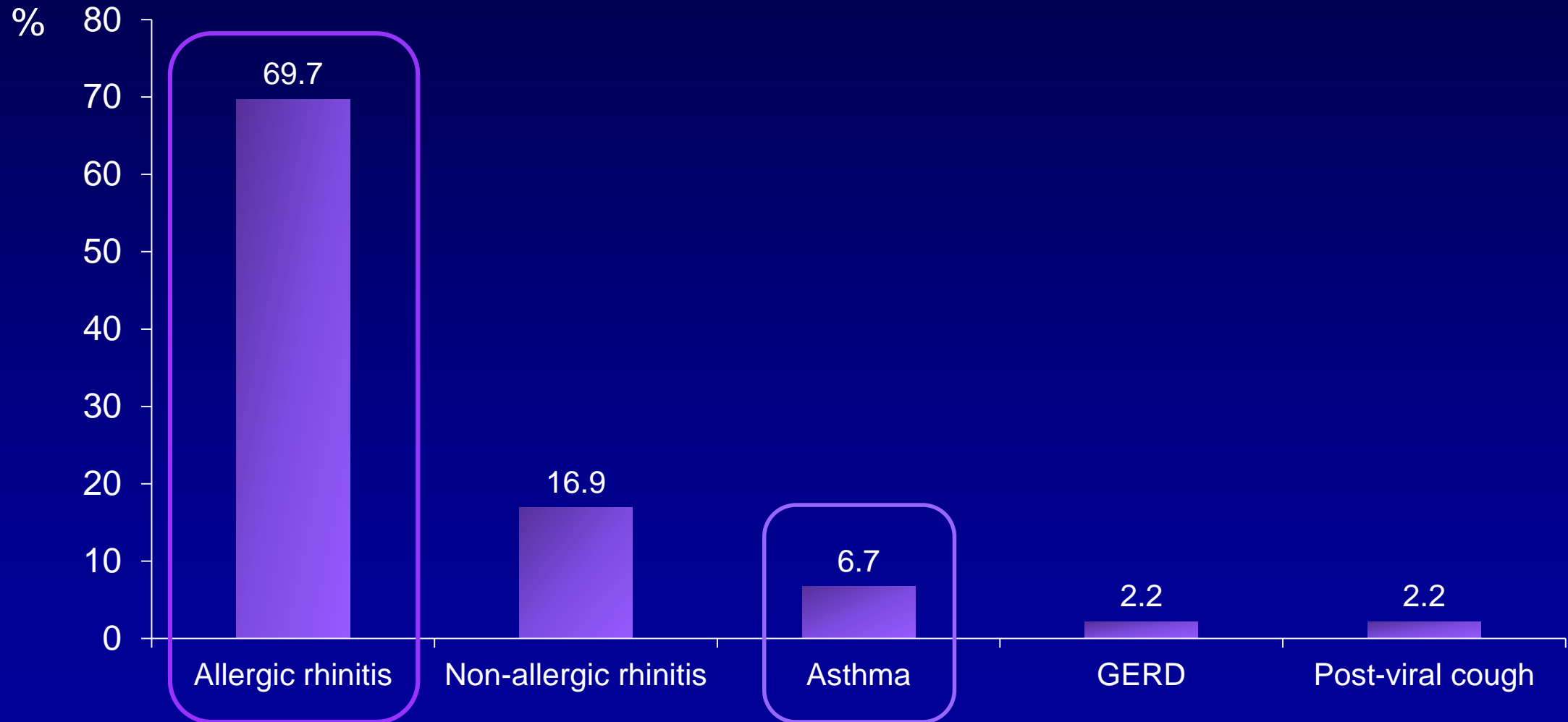
Pre-study diagnoses were **asthma(50%)**, no diagnosis(31.5%), bronchitis(2.2%)



# Causes of chronic cough in children in Chongqing

- 266 children with chronic cough >4weeks were enrolled
- Results:
  - 47% received a diagnosis of cough variant asthma (CVA)
  - 21.8% were diagnosed with CVA and upper airway cough syndrome (UACS)
  - 16.5% were diagnosed with post-infectious cough
  - 13.2% were diagnosed with upper airway cough syndrome
- Etiology according to age
  - $\leq 3$  yrs old – 70% with CVA and 20% with post-infectious cough
  - 3-6yrs old – 50.7% had CVA
  - $\geq 6$  yrs old - UACS

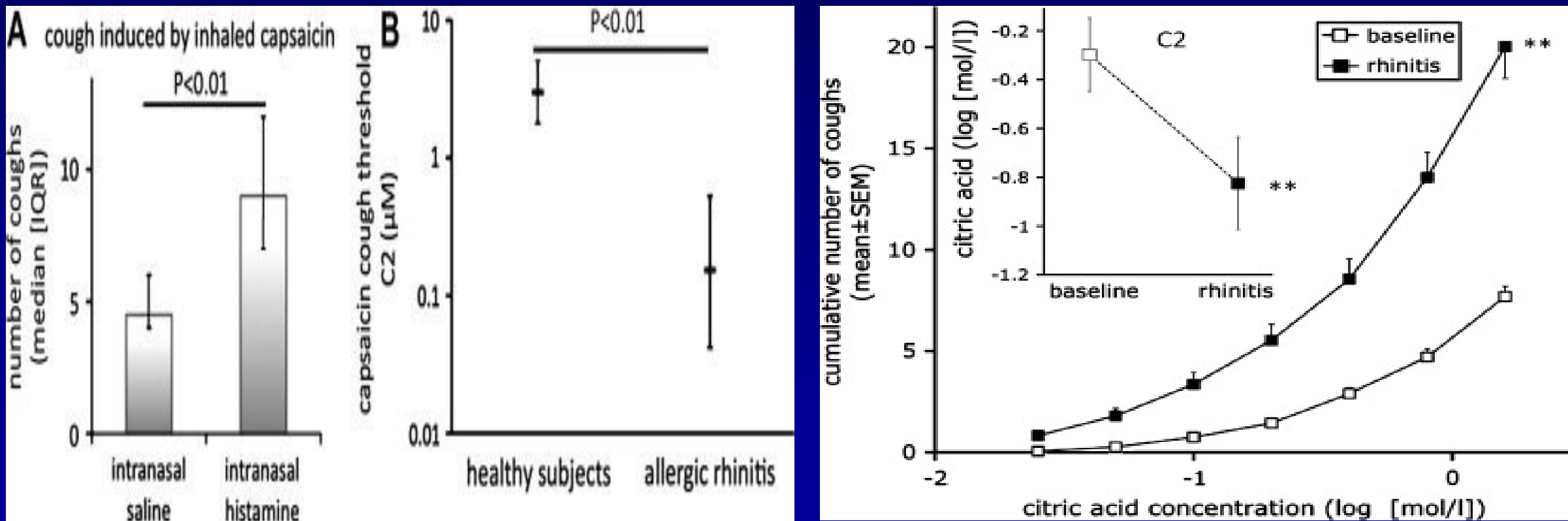
# Causes for chronic cough in children >6yrs old referred to a Children's Hospital



# Cough reflex hypersensitivity amplify cough in patients with allergic rhinitis

Cough reflex hypersensitivity is a condition in which the cough reflex is more readily inducible resulting a lower intensity of a stimulus to trigger cough or enhanced cough in response to a stimulus

Capsaicin and histamine applied to the nose causes sensitisation of the cough reflex through activation of nasal sensory nerves



# Chronic cough and asthma

## Community study

- persistent nocturnal cough in children **not** indicative of asthma in the absence of
  - wheeze
  - shortness of breath
  - chest tightness

*Ninan et al. Arch Dis Child 1995;73:403-7*

- majority of children with recurrent cough improve spontaneously with time

*Powell et al. Arch Dis Child 1996;75:385-91*

*Lewis HM. Arch Dis Child 1994;70:554*

*Wright et al. Am J Respir Crit Care Med 1996;153:1259-65*

# Studies that examine relationship between chronic cough and asthma

- Thomson et al
  - Case series in tertiary centre (n=49)
  - None had asthma as the final diagnosis
- Faniran et al
  - Community-based study (n=1,178)
  - None had asthma
- Strauch et al
  - Community-based study
  - AHR associated with wheeze and dyspnoea but not associated with dry/nocturnal cough
- Goh et al
  - 6.9% complained of breathlessness who had rhinitis vs 33.3% who had asthma (n=89)

*Chang AB. Blackwell Science 2003;57-73*

# Summary

- Over-diagnosis of cough-variant asthma
- Isolated cough in the community is rarely due to asthma

# Studies that examine relationship between chronic cough and infections

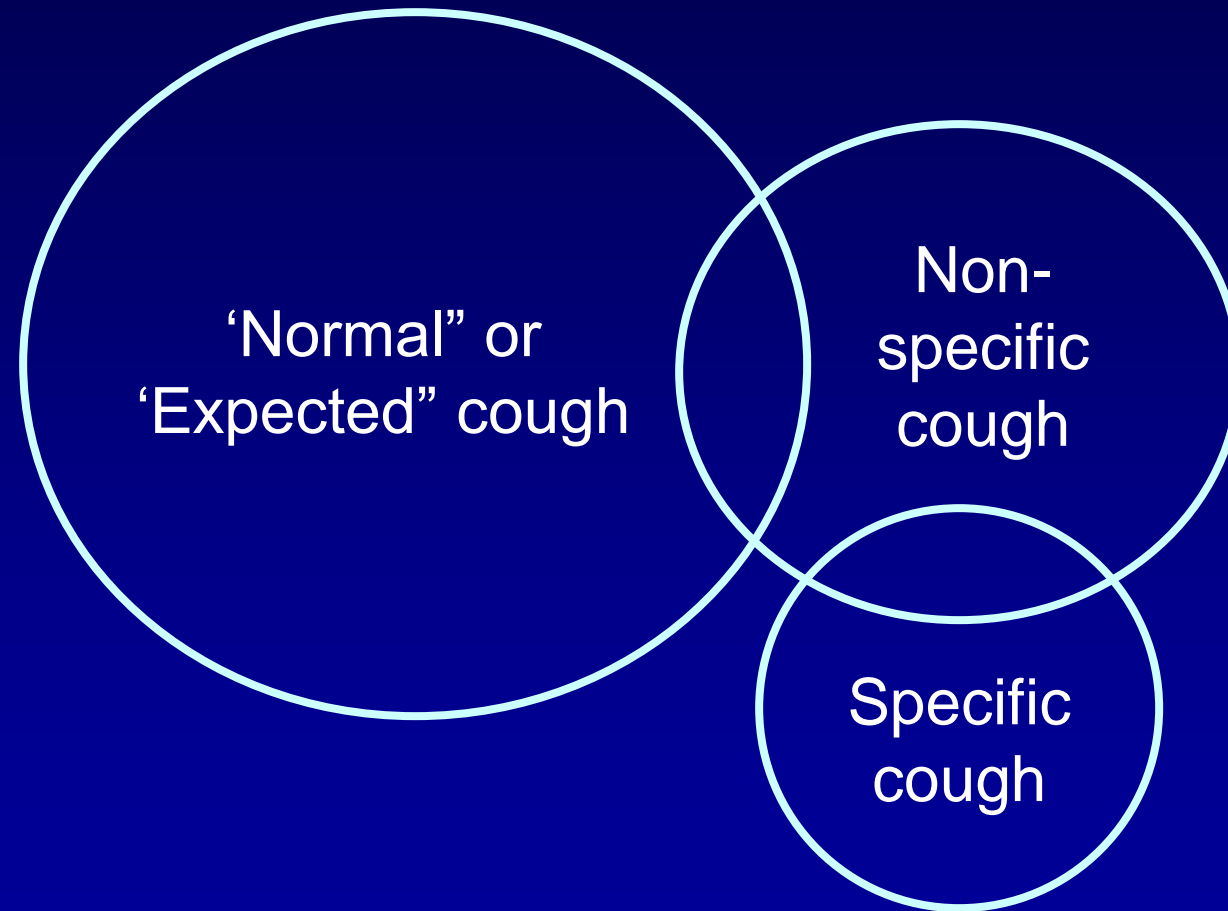
- Senzilat et al
  - Adolescents and adults (n=442)
  - 20% had laboratory evidence of pertussis
- Hallander et al
  - Prospective vaccine study in 3-34 months old
  - *B. pertussis* (56%), *M. pneumoniae* (26%), *C. pneumoniae* (17%), *B. parapertussis* (2%)
- Tozzi et al
  - Prospective study in children <6yrs old
  - Pertussis in unvaccinated children



# Summary

- The main infective organism is *Bordetella pertussis*
- Antibiotic of choice will be macrolides

# Classification of types of cough in children



# Specific cough

## Definition:

- Cough in the presence of other abnormal physical findings

# Pointers to specific cough

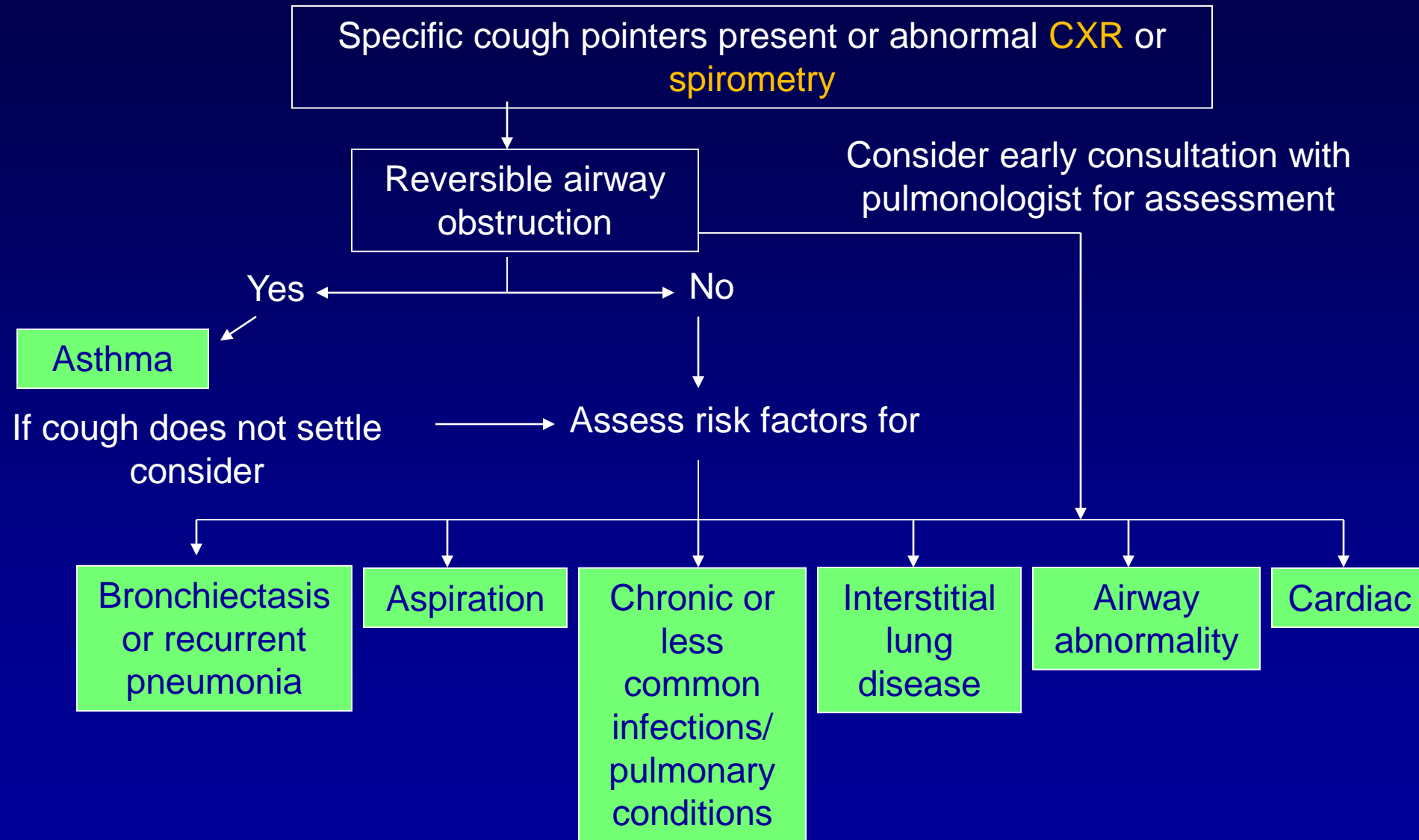
## History

- Chest pain
- Daily productive cough
- Exertional dyspnoea
- Failure to thrive
- Feeding difficulties
- Haemoptysis
- Immunodeficiency
- Neurodevelopmental abnormality
- Recurrent pneumonia

## Physical examination

- Cardiac abnormalities
- Dyspnoea/tachypnoea
- Chest wall deformity
- Clubbing
- Hypoxia/cyanosis
- Auscultatory findings of crepitations or wheeze

# Approach to specific cough



# Approach to non-specific cough

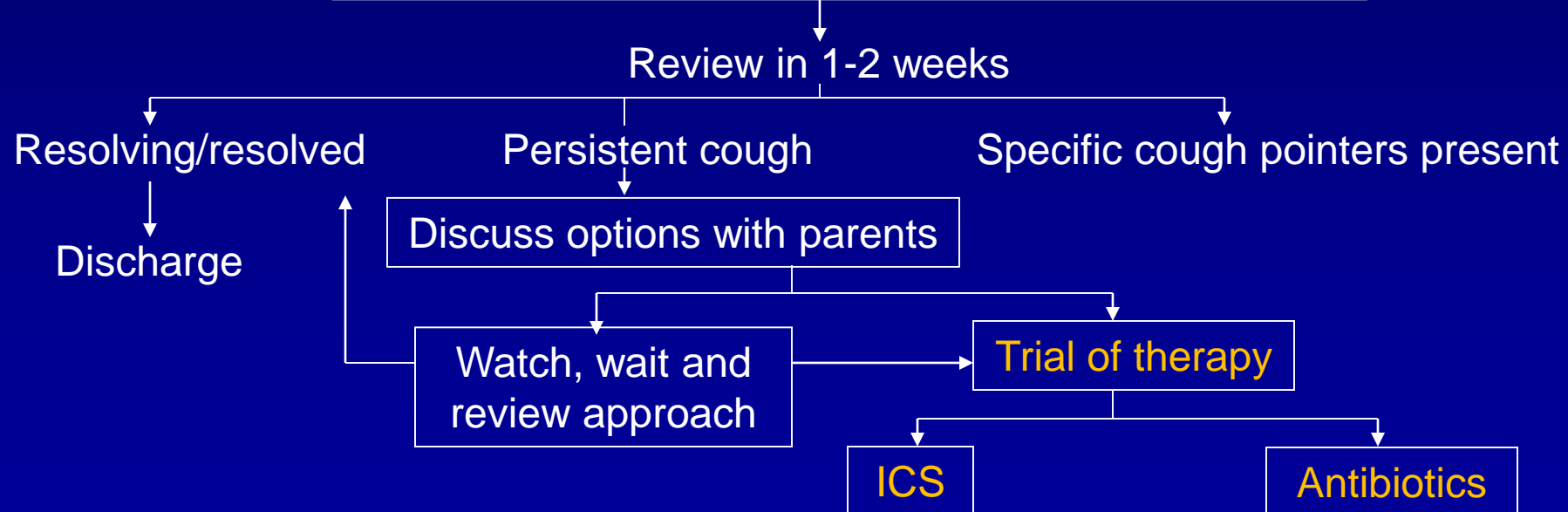
## Watch, wait and review

- usually post viral or acute bronchitis
- exclude foreign body, asthma, upper airway disorders, functional disorders, infections, GERD, ear problems

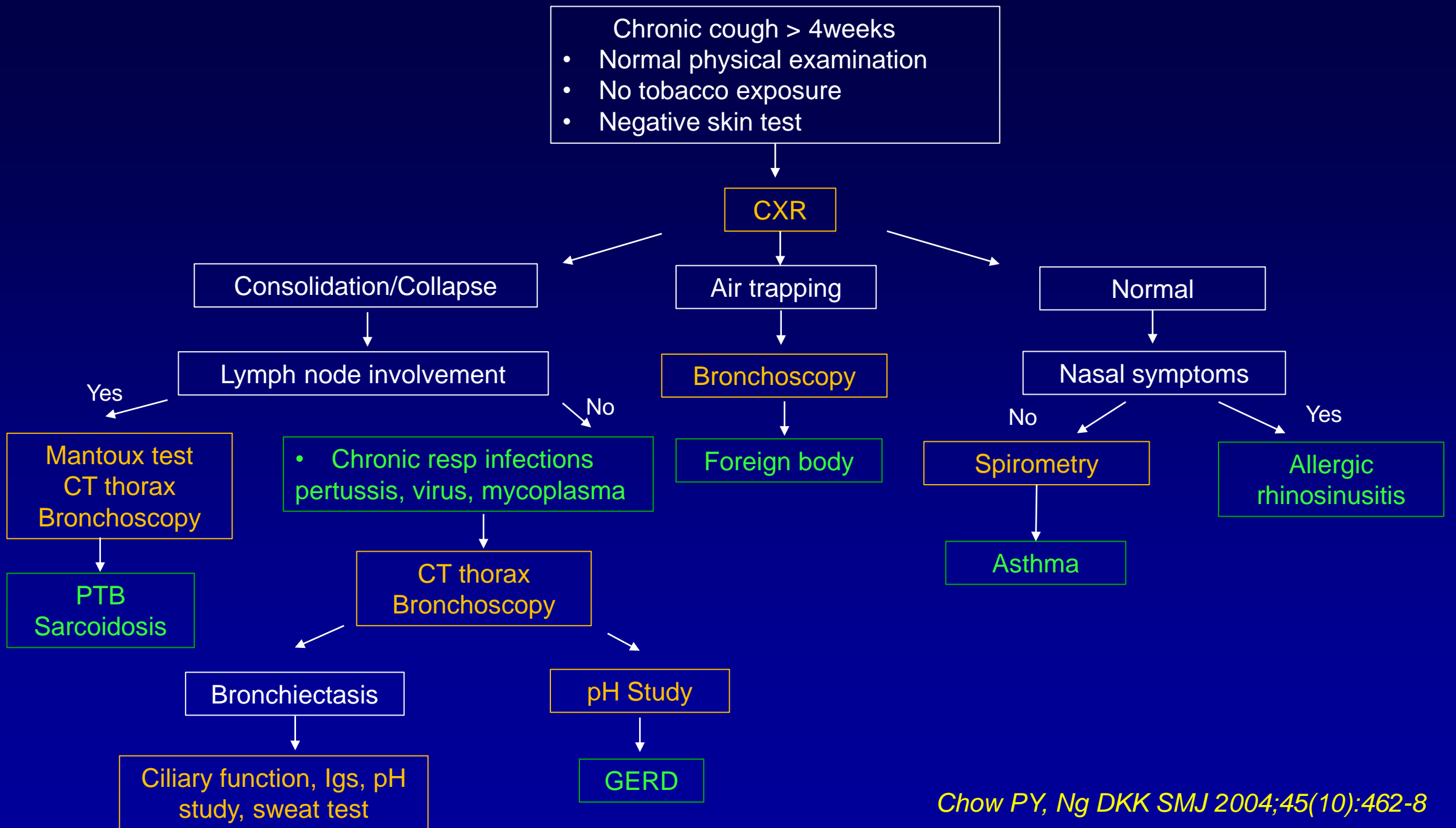
And

## Evaluate

- tobacco smoke and other pollutants
- child's activity, parental expectations and concerns
- treat any obvious illness above



- 70.6% resolved without medical intervention



# Evidence for commonly prescribed therapies for chronic cough

- Antibiotics
- Antihistamines
- Asthma therapy



# Use of Antibiotics

- Cochrane systematic review of 2 RCT
- Results:
  - 140 children  $\leq$  7yrs old in meta-analysis
  - Antibiotics reduced proportion of children not cured at review; pooled OR 0.13
  - Progression of disease was lower in the treatment group; OR 0.10
- Conclusions:
  - Antibiotics likely to be beneficial in those with chronic moist cough but more studies required

# Use of Antihistamines

- Cochrane systematic review of 3 RCT
- Results:
  - 182 subjects
  - Clinical heterogeneity present
  - 2 studies showed improvement in both intervention and placebo groups with no difference between groups
  - 1 study showed greater efficacy with antihistamine in children with seasonal allergic rhinitis and effect was seen within 2 weeks of treatment
- Conclusion:
  - The review has significant limitations
  - Uncertain efficacy of antihistamines
  - If trial of therapy given, clinical response should occur within 2 weeks of therapy

# Use of asthma therapy

- Use of bronchodilators ( $\beta$ -agonist, anticholinergics, methylxanthines)
  - No evidence for use and no benefit demonstrated

*Chang et al. Arch Dis Child 1998;79:6-11*

*Chang et al. Cochrane Database Syst Rev 2003*

*Chang et al. Cochrane Database Syst Rev 2005 Jul 20(3):CD005310*

- Sodium cromoglycate and Nedocromil sodium
  - No evidence for its use

*Chang et al. Cochrane Database Syst Rev 2004*

# Use of asthma therapy

- Inhaled corticosteroids
  - 123 subjects in 2 RCT using BDP 400mcg/day or FP 2mg/dayx3 days followed by 1mg/dayx11days compared with placebo
- Results:
  - No difference with BDP vs placebo
  - Higher dose of FP showed significant improvement in nocturnal cough - smaller but significant improvement also seen with placebo
- Conclusion:
  - Clinical impact of ICS unlikely to be beneficial

## Effect of cigarette smoke

- AAP recommends counseling on reduction of tobacco exposure for management of cough in children irrespective of etiology
- No RCTs have examined the effect of cigarette smoke exposure on cough
- 1 report on cessation of ETS as a successful form of therapy for cough in children

# Summary

- Chronic cough is common in children
- Majority of these will resolve spontaneously without treatment
- Chronic cough associated with asthma is uncommon in the absence of wheeze or breathlessness
- Specific causes should be excluded especially in the presence of abnormal physical findings
- Allergic rhinitis and non-allergic rhinitis was a common cause of chronic cough in local children, therefore a trial of therapy with antihistamines and nasal sprays can be tried and reviewed after 2 weeks for improvement of cough





***Thank You***

