Cough in Children

Screening

Annually:

Ask child/carer at annual child health check or on presentation with respiratory symptoms:

- **Does your child cough, and if so, how often? At night?**
- **Is it a dry cough or a wet cough?**
- **Does your child get short of breath when she/he runs around / exercise?**
- **Does your child wheeze?**
- **Has your child had a cough for more than 4 weeks?**

⚠ **Ask yourself is this child at risk of Chronic Suppurative Lung Disease (CSLD)?**

1. **Wet or productive cough for more than 4 weeks**
2. **2 or more chest infections in last year**
3. **Treated for pneumonia in last 4 weeks (up to 25% children post pneumonia will develop CSLD)**
4. **3 hospital admissions for chest problems (ever)**
5. **Episode of severe pneumonia (admission to ICU)**
6. **Chest deformity**
7. **Persistent signs when listening with stethoscope (crackles, unequal air entry, bronchial breathing, wheeze)**

Refer to GP for assessment and management ALL children who fulfil one or more of the above criteria.

NOTE: Child > 7 years: perform Spirometry and refer to GP

Initial Assessment

Age in years	Normal breathing rate (breaths/min)*
< 1	30 - 40
1 - 2	25 - 35
2 - 5	25 - 30
5 - 12	20 - 25
> 12	12 - 20

*children with cough and fast breathing probably has a respiratory/chest disease and should be discussed with a GP.

Are the symptoms new/acute?

Any acutely unwell child should be discussed with a GP immediately – refer to "Sick Kids" protocol in < 5 age group(hyperlink). Pneumonia is the commonest preventable cause of death in Indigenous children under 5 years of age – always consider: could this be pneumonia (see below)

Are the symptoms old/chronic?

Both asthma and chronic suppurative lung disease can lead to serious adverse outcomes, including death - early diagnosis and treatment is known to improve both short and long term outcomes and reduces the risk of death.

Acute Illness

Pneumonia in Children

Case Definition

Any child with cough and tachypnea (fast breathing) and any fever > 38.5^{0}C likely has pneumonia. Always refer to a GP or paediatrician and should be treated as follows:

Moderate/ severe pneumonia and/ or any danger signs, i.e.:

- **Chest in-drawing.**
- **Not interested in what is happening, drowsy (lethargic)**
- **Not able to eat/feed**
- **Stops breathing for short periods (apnoea) — mainly younger children O2 sats < 94%.**
- **Looks lethargic / sick.**

Principles of Management

Moderate/Severe pneumonia

- **Administer oxygen.**
- **Arrange transfer / evacuation to hospital. Discuss initial antibiotic choice with Paediatrician. Usually ceftriaxone 50mg/kg IV/IM/IO +/- Vancomycin**

Mild pneumonia / no danger signs

Then

- **Under 3 months of age: admit to hospital for inpatient care**
- **Over 3 months: consider most appropriate site for care – inpatient vs outpatient; discuss with paediatrician if uncertain.**
- **Give amoxicillin 25mg/kg per dose (max 1g) three times daily for five days**
- **Review daily while on antibiotic treatment to monitor progress. Add azithromycin if >5y.o and no improvement after 48h.**
- **Discuss with doctor if allergic to penicillin.**
- **REVIEW AT WEEKS to ensure resolution of wet cough – at high risk development of CSLD.**

Consider Other causes:

- **Influenza**
- **Acute Asthma** http://www.asthmahandbook.org.au/management/children
- **Bronchiolitis (infants <12 months of age)**
- **Whooping cough (usually more cough and not wheeze)**
- **Foreign body inhalation (symptoms started after a choking episode).**

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Chronic Illness

Case definitions from WAhealthpathways

Case Definition

Chronic respiratory disease in children may have a variety of causes. In the Kimberley population chronic cough is often normalised and must be followed up due to risk of chronic suppurative lung disease (CSLD).

Cough is common in children (5 to 10% prevalence), and usually presents acutely in the setting of an obvious respiratory tract infection.

- **Over-the-counter medications for cough have little benefit and are contraindicated for children aged < 6 years.**
- **Persistent cough (> 4 weeks) in children requires further assessment, *especially* persistent wet cough. Address the underlying condition, rather than the symptoms.**
- **Preschoolers can have 6 or more acute upper RTIs a year. Cough may last 1 to 3 weeks with each episode. Consider underlying lung disease when the cough does not clear up in between episodes.**
- ***Note: asthma can also cause chronic cough but usually with associated episodes of wheeze and/or shortness of breath**

Ask about:

- **Onset/Pattern e.g., sudden onset while eating or playing (particularly after a choking episode), or without a viral prodrome may suggest foreign body inhalation.**
- **Type of cough e.g., dry or wet.**
- **Pattern of cough e.g.:**
  - **paroxysmal cough with post-tussive vomiting may suggest pertussis.**
  - **staccato cough suggests chlamydia in infants.**
  - **cough which is absent during sleep suggests habit cough.**
- **Cough triggers e.g., drinking, lying down, exercise, allergens. Always ask about choking with feeds**
- **Symptoms of chronic rhinitis, atopic conditions, and asthma.**
- **Exercise tolerance.**
- **Other symptoms e.g. SHORTNESS OF BREATH, wheeze, fevers, swallowing trouble, haemoptysis, sweats, poor growth.**
- **Medication history**
- **Tobacco smoke exposure**
- **Previous hospital admission/respiratory problems.**
- **ALWAYS consider risk of foreign body inhalation (symptom onset after a choking episode)**
- **Social history to identify social determinants of respiratory disease e.g. overcrowding**

Assesment

Perform full observations and examination including height, weight, pulse oximetry – urgent review if <95%, RR (see above table), consider spirometry if > 7 years old. Consider CXR in discussion with paediatrician but it is usually not necessary for diagnosis.

Features that suggest a significant underlying cause

Poor weight gain or failure to thrive, noisy breathing – stridor or wheeze, finger clubbing, chest wall abnormality, persistent or persistently asymmetrical chest signs e.g. crackles , hypotonia, neurodevelopmental delay, craniofacial malformations, dyspnoea – chronic or exertional , Hypoxia

Principles of Management

Management depends on if the chronic cough (>4 weeks) is dry or wet:

Chronic dry cough causes to consider:

Post-viral cough, cough due to asthma, pertussis (whooping cough), other infections e.g., mycoplasma, chlamydia, psychogenic cough, less common causes e.g. tracheomalacia, interstitial lung disease

GORD is not a common cause of cough in children

Persistent wet cough causes to consider:

Persistent wet cough implies increased airway secretions or reduced clearance.

Persistent Bacterial Bronchitis (PBB) or Chronis Suppurative Lung Disease (CSLD) is an important and under-diagnosed cause in the Kimberley. Consider if your approach is culturally safe or a cultural mentor is needed. Other unusual but important considerations are cystic fibrosis, tuberculosis and aspiration syndromes.

Cough in Children

Chronic Wet Cough

Case Definition: PBB

Protracted Bacterial Bronchitis (PBB)

Defined as wet cough lasting for > 4 weeks without specific pointers of an alternative cause, and which responds to antibiotic therapy.

- Up to 40% of chronic wet cough in children referred to secondary care[1].
- Untreated PBB may contribute to development of chronic suppurative lung disease (CSLD) and/or bronchiectasis.
- Chest X-ray is not necessary for diagnosis
- Cough responds to antibiotic treatment but response can take 10 to 14 days.
- PBB often requires 2 to 4 weeks of antibiotic therapy.
- Common organisms are *Haemophilus influenza*, *Streptococcus pneumonia*, and *Moraxella cattarrhalis.*
- > 2 episodes of PBB in a year should be referred for further investigation to a paediatrician or paediatric respiratory service.

Case Definition: Bronchiectasis

Bronchiectasis is a progressive disease characterised by dilated, thick-walled bronchi, usually with associated chronic bacterial infection and inflammation.

- **The diagnosis is made with High Resolution CT (HRCT) scan. This is usually ordered under advice from Paediatrician.**
- **A plain CXR may be normal in up to 50% of children with bronchiectasis. Chest X-ray may show peribronchiolar changes or obviously dilated bronchi.**
- **Spirometry may be normal, or sometimes obstructive.**
- **Can follow a severe chest infection, or be associated with underlying disease e.g., cystic fibrosis (CF), ciliary defects, recurrent aspiration. Non-CF bronchiectasis is more common in Aboriginal and Torres Strait Islander children.**

Case Definition: CSLD

The term Chronic Suppurative Lung Disease (CSLD) is used to describe the clinical picture of children with recurrent episodes of PBB. They are at risk of having/or developing bronchiectasis, regardless of whether or not the child has had a HRCT scan to confirm the underlying diagnosis of bronchiectasis.

Think of CSLD if:

1. **Wet or productive cough for more than 4 weeks**
2. **2 or more chest infections in last year**
3. **Treated for pneumonia in last 4 weeks (up to 25% children post pneumonia will develop CSLD)**
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7. **Persistent signs when listening with stethoscope (crackles, unequal air entry, bronchial breathing, wheeze)**

All children with suspected CSLD / bronchiectasis should be referred to a paediatrician for consideration of HRCT to confirm the diagnosis.

Principles of Management

Chronic wet cough (duration >4 weeks) in the absence of shortness-of-breath and wheeze is usually caused by:

1. **PBB**
2. **CSLD**
3. **Bronchiectasis**

Important to rule out:

1. **Tuberculosis**
2. **Inhaled foreign body**

Early diagnosis and intervention may prevent or delay progression.

Refer early to the regional Pediatrician, to confirm diagnosis, arrange investigations for treatable underlying causes, and to contribute to planning of ongoing care.

Physiotherapy is important in CSLD and bronchiectasis for helping to improve lung function and reduce exacerbations.

Exacerbations of CSLD are usually due to infection and should be treated promptly and intensively to minimise the risk of serious acute illness, as well as reducing long-term progression by minimising the amount of harm done to airways during each exacerbation.

Therapeutic Protocols

Medication

Empirical antibiotic treatment for PBB and exacerbations of CSLD is the same.

If no sputum culture is available to guide treatment, use broad spectrum antibiotic e.g:

Amoxycillin/clavulanate 22.5 mg/kg (maximum 875 mg amoxycillin) twice a day for 14 days then REVIEW.

If penicillin-allergic, consider azithromycin 30 mg/kg/dose once a week for 4 weeks

Check Paediatrician communication/if prior sputum results are known as this may guide antibiotics choice.

If not improving in 2 weeks

- Give same antibiotic at same dose for another 14 days

If **wet cough still present after 4 weeks of antibiotics –refer Paediatrician as may need to send to hospital for IV antibiotics**

Asthma

Asthma may be also be present – manage as per Australian guidelines:
http://www.asthmahandbook.org.au/management/children

Cough in Children

Care planning

All children with CSLD should have a multidisciplinary care plan developed and reviewed at least 6 monthly, involving parents/carers, child, primary health care team, allied health and specialist services.

Follow Up

CHECK	DO
Chest physiotherapy plan for children with CSLD or bronchiectasis. Look in file notes for physiotherapy plan Head down postural drainage no longer recommended If no plan – ask for one	Encourage family/carers to give chest physiotherapy every day Encourage child to exercise every day Ask physio for help if needed
Weight	Nutritional supplements may be needed See Growth Faltering Protocol (hyperlink) Consider dietitian refferal
Immunisations	Influenza immunisation is recommended ; refer to Australian Immunisation Handbook for schedule and dosage information. Ensure pneumococcal immunization (Prevenar, Pneumovax) is up to date.
Wheeze	Asses and treat if concurrent asthma
Exposure to smoke	Avoid smoke from cigarettes, wood Fires Warn children with CSLD about danger to their lungs from smoking
Regular medications	Make sure child taking medicines Some will be on maintenance antibiotics and/or asthma medicines from Paediatrician
Manage exacerbations	Following acute exacerbations, review daily until improving, then weekly for the following 2 weeks. At review, check sputum results (if sent) - consider changing antibiotic if sputum culture shows resistance to antibiotics selected.
Referrals	Paediatrician 6 monthly Physiotherapy 6 monthly for children with CSLD or bronchiectasis.

Refer/Discuss

To Paediatrician:

- **Feed-associated coughing.**
- **Growth Faltering/ failure to thrive.**
- **Recurrent pneumonia OR Frequent hospitalisation.**
- **Suspected CSLD - bronchiectasis, CF, or recurrent aspiration syndromes.**
- **Suspected PBB unresponsive to 4 weeks of antibiotics, or > 2 episodes a year.**
- **Persistent non-specific dry cough lasting > 12 weeks.**
- **Significant and persistent chest X-ray abnormalities.**
- **Repeatedly positive sputum cultures, especially for Staphyloccocus aureus or Pseudomonas aeruginosa.**
- **Suspected diagnosis of asthma/CSLD in any child under 3 years.**
- **Following any severe asthma attack requiring hospitalisation**
- **Diagnosis uncertain OR features on history or examination suggest significant underlying respiratory cause, especially haemoptysis, or clubbing.**
- **Poor response to treatment and asthma not under control eg. Day time symptoms more than 2x/week, night time symptoms once per week, need for reliever > 2 days per week and no limitation of activities.**
- **Asthma preventer requirement of more than 250mcg fluticasone total daily dose.**
- **Frequent courses of oral steroids**
- **For Regular Review 6 monthly for CSLD**

To Physiotherapist:

Ensure all children with CSLD are seen by a physiotherapist soon after diagnosis, then at least 6 monthly depending on access/ availability.

Resources

Asthma guidelines:

http://www.asthmahandbook.org.au/management/children