

# Management of Children With Chronic Wet Cough and Protracted Bacterial Bronchitis

## CHEST Guideline and Expert Panel Report



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**BACKGROUND:** Wet or productive cough is common in children with chronic cough. We formulated recommendations based on systematic reviews related to the management of chronic wet cough in children (aged  $\leq 14$  years) based on two key questions: (1) how effective are antibiotics in improving the resolution of cough? If so, what antibiotic should be used and for how long? and (2) when should children be referred for further investigations?

**METHODS:** We used the CHEST expert cough panel's protocol for systematic reviews and the American College of Chest Physicians (CHEST) methodologic guidelines and GRADE framework (the Grading of Recommendations Assessment, Development and Evaluation). Data from the systematic reviews in conjunction with patients' values and preferences and the clinical context were used to form recommendations. Delphi methodology was used to obtain consensus for the recommendations/suggestions made.

**RESULTS:** Combining data from the systematic reviews, we found high-quality evidence in children aged  $\leq 14$  years with chronic ( $> 4$  weeks' duration) wet/productive cough that using appropriate antibiotics improves cough resolution, and further investigations (eg, flexible bronchoscopy, chest CT scans, immunity tests) should be undertaken when specific cough pointers (eg, digital clubbing) are present. When the wet cough does not improve following 4 weeks of antibiotic treatment, there is moderate-quality evidence that further investigations should be considered to look for an underlying disease. New recommendations include the recognition of the clinical diagnostic entity of protracted bacterial bronchitis.

**CONCLUSIONS:** Compared with the 2006 Cough Guidelines, there is now high-quality evidence for some, but not all, aspects of the management of chronic wet cough in specialist settings. However, further studies (particularly in primary health) are required.

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**KEY WORDS:** children; cough; evidence-based; guidelines; management

**ABBREVIATIONS:** FB = flexible bronchoscopy; KQ = key question; PBB = protracted bacterial bronchitis; RCT = randomized controlled trial

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## Summary of Recommendations/Suggestions

1. For children aged  $\leq 14$  years with chronic ( $> 4$  weeks' duration) wet or productive cough unrelated to an underlying disease and without any specific cough pointers (eg, coughing with feeding, digital clubbing), we recommend that children receive 2 weeks of antibiotics targeted to common respiratory bacteria (*Streptococcus pneumoniae*, *Haemophilus influenzae*, *Moraxella catarrhalis*) and local antibiotic sensitivities (Grade 1A).

2. For children aged  $\leq 14$  years with chronic wet or productive cough unrelated to an underlying disease and without any specific cough pointers (eg, coughing with feeding, digital clubbing) and whose cough resolves within 2 weeks of treatment with antibiotics targeted to local antibiotic sensitivities, we recommend that the diagnosis of protracted bacterial bronchitis (PBB) be made (Grade 1C).

3. For children aged  $\leq 14$  years with PBB with lower airway (bronchoalveolar lavage or sputum) confirmation of clinically important density of respiratory bacteria ( $\geq 10^4$  cfu/ml), we recommend that the term 'microbiologically-based-PBB' (or PBB-micro) be used to differentiate it from clinically-based-PBB (PBB without lower airway bacteria confirmation) (Grade 1C).

4. For children aged  $\leq 14$  years with chronic wet or productive cough unrelated to an underlying disease and without any specific cough pointers (eg, coughing with feeding, digital clubbing) when the wet cough persists after 2 weeks of appropriate antibiotics, we recommend treatment with an additional 2 weeks of the appropriate antibiotic(s) (Grade 1C).

5. For children aged  $\leq 14$  years with chronic wet or productive cough unrelated to an underlying disease and without any specific cough pointers (eg, coughing with feeding, digital clubbing), when the wet cough persists after 4 weeks of appropriate antibiotics, we suggest that further investigations (eg, flexible bronchoscopy with quantitative cultures and sensitivities with or without chest computed tomography) be undertaken (Grade 2B).

6. For children aged  $\leq 14$  years with chronic wet or productive cough unrelated to an underlying disease and with specific cough pointers (eg, coughing with feeding, digital clubbing), we recommend that further investigations (eg, flexible bronchoscopy and/or chest computed tomography, assessment for aspiration

and/or evaluation of immunologic competency) be undertaken to assess for an underlying disease (Grade 1B).

7. For children aged  $\leq 14$  years with chronic wet or productive cough unrelated to an underlying disease and without any specific cough pointers (eg, coughing with feeding, digital clubbing), we suggest that randomized controlled trials on the efficacy of different durations of antibiotics be undertaken in various clinical settings (particularly in primary care) to determine its influence on the number to treat and recurrence. When doing so, we suggest that validated cough outcomes and a-priori definitions be used (Ungraded, Consensus Based Statement).

Chronic wet cough is common among children whose parents seek medical consultations from specialty centers.<sup>1</sup> Young children do not usually expectorate. Thus the term wet cough is used instead, and this is defined by its loose, self-propagating sound, was substituted for productive cough in this age group.<sup>2</sup> When children can expectorate, the term productive cough is preferred.<sup>3</sup> Decades ago, astute clinicians recognized that early diagnosis and management of chronic productive cough were likely important for future lung health.<sup>4,5</sup> Additional reasons why the recognition and treatment of chronic wet/productive cough in children are important were highlighted previously.<sup>3</sup>

The 2006 American College of Chest Physicians (CHEST) guidelines on chronic cough in children<sup>6</sup> advocated that when a wet cough was present and there were no other symptoms and signs (eg, dysphagia or digital clubbing), antibiotics should be prescribed. However, this recommendation was made with the use of limited evidence. For the present update as required by the CHEST Guideline Committee, we undertook systematic reviews addressing key questions (KQs) concerning the management of children with chronic wet or productive cough unrelated to established chronic lung disease (ie, when children first present to clinicians with a previously undiagnosed condition).<sup>3</sup> The present article is a summary of the evidence behind the recommendations formulated on findings of the systemic reviews that examined two related KQs in children with chronic ( $> 4$  weeks) wet or productive cough not related to bronchiectasis. KQ1 was as follows: How effective are antibiotics in improving the resolution of cough? If so, what antibiotic should be used and for how long? KQ2 was as follows: When should children be referred for further

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