

Bronchiolitis in infants

What is bronchiolitis?

Bronchiolitis is an acute viral infection affecting the bronchioles of the lower respiratory tract. Most cases are caused by Respiratory Syncytial Virus (RSV).

Bronchiolitis is the most common lower respiratory tract infection in infants, and between 2006 – 2010, accounted for almost 15% of all childhood illness-related hospital admissions in New Zealand.¹

Risk factors associated with bronchiolitis

A New Zealand study of infants aged under two years, who were hospitalised for bronchiolitis during the 2003 – 2005 RSV seasons (Jun – Oct), found that birth between February and July, prematurity and Māori or Pacific ethnicity were risk factors for hospitalisation.² Additional factors, which partly explain the increased risk in Māori and Pacific children, included higher maternal smoking rates during pregnancy, the socioeconomic status of the infant's community and low birth weight.² Māori and Pacific children are admitted to hospital for acute bronchiolitis at rates approximately three and five times higher respectively, than children of other ethnicities (Figure 1).

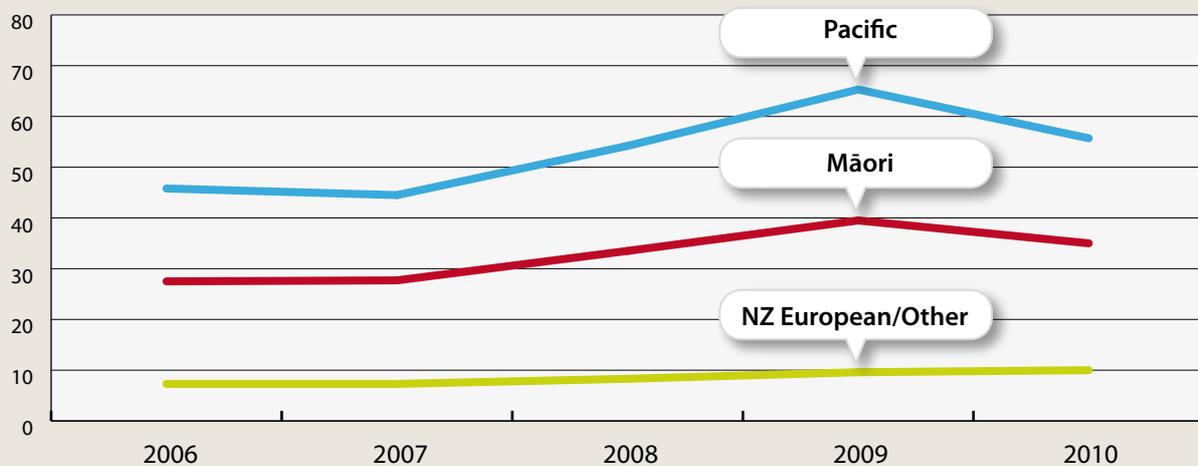


Figure 1: Annual hospital discharge rates for children aged under five years, per 1000 patients, by ethnicity

How to diagnose bronchiolitis

Bronchiolitis is diagnosed clinically. Chest x-rays should not be routinely performed. Bronchiolitis is likely if a child aged under 18 months, who has had initial signs and symptoms of an upper respiratory tract infection, presents with the following features:⁴

- Cough
- Tachypnoea
- Inspiratory crepitations
- Wheeze

Dehydration may occur due to difficulties with feeding and losses with tachypnoea.

A low grade fever (less than 39°C) may be present, but if a high fever is present, alternative diagnoses, such as pneumonia, should be considered (Table 1).^{4,5}

Wheeze in children aged under one year should generally be regarded as being due to bronchiolitis or another disorder, and not asthma. However, some infants with suspected bronchiolitis will have a degree of response to a beta-2 agonist. Consider a diagnostic trial of a beta-2 agonist in a child aged over nine months with recurrent wheeze (especially if atopic), after other causes have been excluded.⁴

 For further information see: "Diagnosing and managing asthma in children", BPJ 42 (Feb, 2012).

Hospitalisation and overcrowding

Overcrowding and sub-standard housing can negatively impact a family's health.³ In New Zealand, there is a correlation between household overcrowding and the risk of contracting infectious diseases, such as meningococcal disease.³ It is probable that overcrowding also increases an infant's risk of developing bronchiolitis.²

The Healthy Housing programme has operated in the Counties Manukau DHB since 2001. Through improving access to health care services and providing larger, warmer and better designed houses for over 3000 Pacific families in low socioeconomic areas, the programme has achieved an 11% reduction in acute hospitalisations for children aged 0 – 4 years and a 23% reduction for people aged 5 – 35 years.³ These results appeared to be most significantly due to reductions in the rates of respiratory infections, asthma and cellulitis.³

Table 1: Alternative diagnoses to bronchiolitis⁴

Alternative diagnosis	Distinguishing clinical features
Asthma	Recurrent wheeze
Pertussis	Cough as the main symptom
Pneumonia	Difficult to distinguish, purulent phlegm production may be more prominent
Inhaled foreign body	Sudden onset of symptoms, history of coughing/choking followed by expiratory wheeze, loss of voice or differential air entry on examination
Congestive heart failure	Cardiac murmur, oedema or a history of slow onset of symptoms, failure to thrive
Cystic fibrosis	Repeated and prolonged respiratory infections, failure to thrive

Table 2: Guidance for the assessment and treatment of bronchiolitis in children aged under 18 months.^{4,6}

Mild	Moderate	Severe
<ul style="list-style-type: none"> Normal respiratory rate No or subtle accessory muscle use Normal heart rate Able to feed Oxygen saturation >95% 	<ul style="list-style-type: none"> Increased respiratory rate Minor accessory muscle use Increased heart rate Difficulty feeding Minor dehydration, e.g. increased thirst Crepitations Oxygen saturation 90-95% 	<p>The presence of poor respiratory effort, cyanosis or apnoea may indicate life threatening bronchiolitis</p> <ul style="list-style-type: none"> Respiratory rate > 60 breaths/minute Moderate/marked accessory muscle use Nasal flare and/or grunting Markedly increased heart rate Feeding < 50% of normal in preceding 24 hours Marked dehydration, e.g. sunken fontanelle, sunken eyes, reduced skin turgor, low urine production, absent tears Toxic appearance Oxygen saturation <90%
Initial treatment		
<ul style="list-style-type: none"> Reassurance and home care 	<ul style="list-style-type: none"> Consider referring if child is aged under three months, is not feeding sufficiently, if there is parental distress or if social circumstances are a concern 	<ul style="list-style-type: none"> Send to hospital by ambulance Provide oxygen if available
<ul style="list-style-type: none"> Encourage small frequent feeds If nasal congestion, trial saline nasal drops Reassure parents that improvement can be expected within three days, but give instructions to return if there is any concern or if symptoms become severe, e.g. tell them to look for dry nappies, refusal to feed, decreased level of alertness or any breathing difficulties such as nasal flaring, use of accessory (neck) muscles 		

N.B. If the child presents with signs or symptoms across categories then management should be according to the most severe symptoms.

Assessment of bronchiolitis

Infants aged under one month with suspected bronchiolitis should be referred to hospital. Table 2 provides guidance on the assessment and treatment of bronchiolitis in primary care.^{4,6} A lower threshold for referral is recommended in the management of infants aged under three months and infants with underlying cardio-respiratory disease.⁴

Socioeconomic factors, e.g. housing quality, should also be considered when managing infants. A lower threshold for admission may be appropriate if the family home environment is considered to be contributing to the condition.

Management of bronchiolitis

A child with mild to moderate bronchiolitis can be managed at home. Pharmacological treatment is not required. It should be explained to parents and caregivers that in the first 72 hours the symptoms may worsen before starting to improve. Instructions should be given on how to identify concerning signs of deterioration, e.g. marked dehydration and respiratory distress, and to access after-hours care if required. This is especially important for Māori and Pacific families, as Māori or Pacific ethnicity is an independent risk factor for hospitalisation for bronchiolitis.²

Infants who become dehydrated or who are feeding at below half of the normal amount in a 24 hour period should be assessed and referred to hospital if necessary. High risk-infants, e.g. aged under three months or with underlying co-morbidities, who are examined early in the illness, should be reassessed within 24 hours for signs of deterioration.

Fluids (e.g. breast milk) should be given in small amounts, frequently, to prevent dehydration.

Saline drops may be be trialled if there is nasal congestion.

Steam inhalation is sometimes used for symptomatic relief, however, there is no evidence that it is effective in the treatment of bronchiolitis.⁷

Antibiotics are ineffective as bronchiolitis is viral in origin.

Inhaled bronchodilators are not recommended for the treatment of infants with bronchiolitis and no other history of recurrent wheeze.⁸ The respiratory symptoms of bronchiolitis are caused by blockage of airways with mucous, rather than airway narrowing, therefore bronchodilators have little benefit. They do not improve oxygen saturation, reduce the need for hospitalisation or shorten the duration of the illness.⁸ Small, short-term improvements in respiratory score following bronchodilation may occur, however, adverse effects include tachycardia and tremor.⁸

There is no evidence to support the use of **oral** or **inhaled corticosteroids** or **ipratropium** for the treatment of bronchiolitis in primary care.

Hospital treatment is also supportive and includes nasal suction, supplemental oxygen, rehydration and maintenance of hydration.

A smoke-free home with a room that is at a comfortable temperature for a lightly clothed adult should be provided for the infant to sleep in. Where possible the infant should avoid close contact with other children to prevent transmission of the disease. Other family members with respiratory symptoms should also avoid close contact in order to reduce the risk of the infant developing a secondary infection. Re-infection is common and hand washing is the best way to prevent RSV transmission.

Post-bronchiolitic wheeze after hospitalisation

Persistent wheeze is experienced by approximately 40% of infants who are hospitalised due to bronchiolitis, continuing up to age five years.⁹ Approximately 10% will continue to have wheezing episodes after age five years, but by age 13 years, wheeze will have resolved in most children.⁹

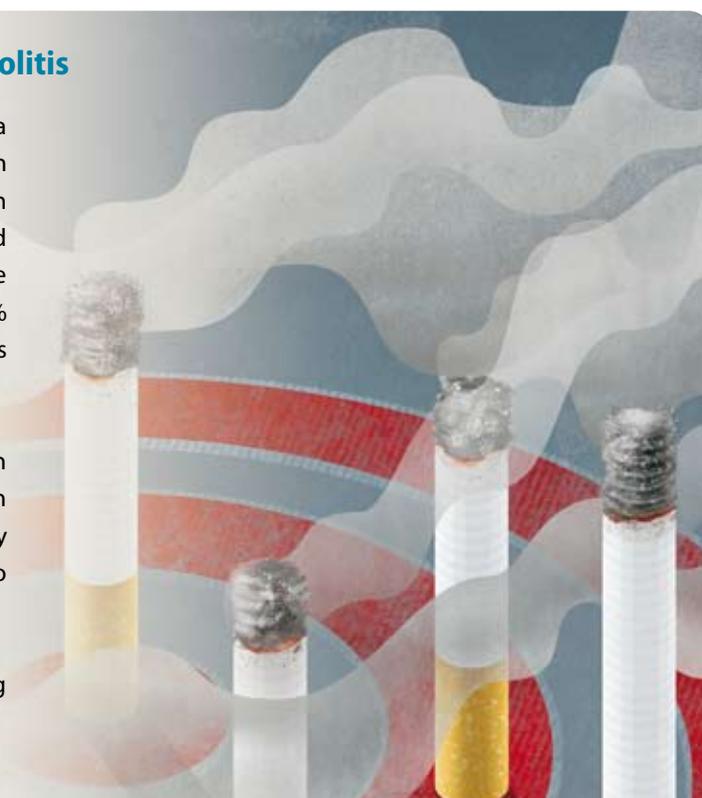
 For further information see: "Bronchiolitis update", BPJ 20 (Apr, 2009).

Passive smoking increases risk of bronchiolitis

Infants in a household where both parents smoke have a risk of developing bronchiolitis three times greater than infants in a household where neither parent smokes.¹⁰ In 2009, approximately 20% of people in New Zealand aged 15 – 64 years were current smokers.¹¹ However, in the same age range, almost 50% of Māori females, over 40% of Māori males and approximately 30% of Pacific adults were current smokers.¹¹

It is recommended that smoking cessation advice be given (using the "ABC" method – Ask, Brief Advice, Cessation support) to any family member who is a smoker.¹² If family members must smoke, stress the importance of doing so outside, away from children and never in a car.

 For further information see: "Update on smoking cessation" BPJ 33 (Dec, 2010).



NEW CLINICAL AUDIT



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